

Exceptional Events Demonstration Requesting Exclusion of PM_{2.5} Monitor Values Impacted by Wildfires at Pinehurst, Idaho, in 2013



**State of Idaho
Department of Environmental Quality**

September 2016



Printed on recycled paper, DEQ, May 2016, PID
MPOB, CA code 81630. Costs associated with this
publication are available from the State of Idaho
Department of Environmental Quality in accordance
with Section 60-202, Idaho Code.

Table of Contents

Executive Summary	vii
Required Elements of the Exceptional Events Rule.....	viii
Report Organization	viii
Introduction.....	11
1 Conceptual Model.....	11
1.1 Overview	11
1.2 Source Area and Affected Region	12
1.3 Emissions.....	14
1.4 Contributing Weather Phenomena	14
1.4.1 Temperatures	14
1.4.2 Precipitation.....	22
1.4.3 Drought	29
1.4.4 Transport Weather Conditions.....	33
1.5 Path and Timeline from Source Area to Monitors	36
1.5.1 Regional Transport Conceptual Model Description	36
1.5.2 Local Stagnation Conceptual Model Description.....	37
2 Not Reasonably Controllable or Preventable	37
2.1 Source Areas Contributing to the Event.....	37
2.2 Basic Controls Analysis	38
3 In Excess of Historical Fluctuations	39
3.1 Pinehurst Historical Fluctuations	39
4 Clear Causal Relationship.....	43
4.1 Similarity of Chemical Composition of Measured Pollution with that Expected from Sources Identified as Upwind	43
4.2 Occurrence and Geographic Extent of the Event	44
4.3 Alternative Source Hypotheses	47
4.3.1 Prescribed Fires	47
4.3.2 Crop Residue Burning	47
4.3.3 Residential Wood Combustion.....	48
4.3.4 Other Forms of Open Burning	48
4.3.5 On-road Mobile Sources.....	48
4.4 Scenarios.....	48
4.5 Pinehurst Scenario 1: Regional Transport.....	48
4.5.1 Description of Typical Weather Conditions and Transport Winds	49
4.5.2 Transport of Typical Emissions and Spatial Relationship between Sources and Monitor	52

4.5.3	Typical Temporal Relationship between Wildfires and Elevated PM Concentrations at Monitor	52
4.5.4	Comparison of Event-Affected Days to Specific Nonevent Days.....	54
4.5.5	Alternative Source Hypothesis	54
4.6	Scenario 2: Local Stagnation.....	54
4.6.1	Description of Typical Weather Conditions and Transport Winds	54
4.6.2	Transport of Typical Emissions and Spatial Relationship between Sources and Monitor	57
4.6.3	Typical Temporal Relationship between Wildfires and Elevated PM Concentrations at Monitor	57
4.6.4	Comparison of Event-Affected Days to Specific Nonevent Days.....	59
4.6.5	Alternative Source Hypothesis	59
5	Affects Air Quality	59
6	Natural Event or Human Activity Unlikely to Recur	59
7	No Exceedance But For this Event.....	60
8	Mitigation	62
8.1	EER Mitigation Requirement	62
8.2	Daily Interagency Update Reports	62
9	EER Procedural Requirements	62
10	References.....	63
	Appendix A. Monitor Values.....	65
	Appendix B. Pinehurst EER Daily Summaries.....	67
	Appendix C. Alternative Sources	119
	Appendix D. Mitigation–Smoke Advisory Products	125
	Appendix E. Supplemental Materials	131
	8/7/2013	131
	Appendix F. Legal Notification of Public Comment Period	151

List of Tables

Table A.	Monitor values for which DEQ is requesting EPA concurrence.	viii
Table B.	Summary of DEQ demonstration in this report meeting EER elements.....	x
Table 1.	Wildfires in 2013 greater than 40,000 acres contributing to Idaho smoke.....	38
Table 2.	Statistics for 24-hour PM _{2.5} concentrations recorded in Pinehurst during the wildfire season, 2004–2012 and 2013.....	40
Table 3.	Average and 95th and 99th percentile concentrations of PM _{2.5} during the 2004–2012 wildfire periods.....	40
Table 4.	Percentile ranking for the monitor values requested in this demonstration, relative to unaffected days in the same period from 2004–2012.....	41

Table 5. Estimated range of concentrations contributing to Pinehurst values that would not have occurred but for the 2013 wildfires.....	61
Table 6. DEQ compliance with procedural requirements of the Exceptional Events Rule.....	63
Table A-1. Pinehurst monitor values for all days during 2013 wildfire season, AQS 16-079-0017. ^a	65
Table C-1. August burn decisions—northern Idaho.....	120
Table C-2. September burn decisions—northern Idaho.....	121
Table C-3. August burn decisions—southern Idaho.....	122
Table C-4. September burn decisions—southern Idaho.....	123
Table C-5. Prescribed fires in Idaho, July 1–September 14, 2013.....	124

List of Figures

Figure 1. Acres burned by wildfires in Idaho and surrounding states, 2004–2013 (NIFC 2013).	12
Figure 2. Fires active in the Northwest during the approximate period of exceptional events, July 1, 2013, to September 14, 2013. Significant fires are labeled, and the Pinehurst monitor location is denoted by the yellow star.....	13
Figure 3. Average daily wildfire emissions for the period July 2 through September 14, 2013, compared to other source categories from all anthropogenic emissions from the 2011 National Emission Inventory (EPA 2013a).....	14
Figure 4. Idaho mean temperature anomaly, July 2013.....	16
Figure 5. Idaho mean temperature anomaly, August 2013.....	17
Figure 6. Idaho mean temperature anomaly, September 2013.....	18
Figure 7. Idaho mean temperature percentile, July 2013.....	19
Figure 8. Idaho mean temperature percentile, August 2013.....	20
Figure 9. Idaho mean temperature percentile, September 2013.....	21
Figure 10. Idaho precipitation anomaly, July 2013.....	23
Figure 11. Idaho precipitation anomaly, August 2013.....	24
Figure 12. Idaho precipitation anomaly, September 2013.....	25
Figure 13. Idaho mean precipitation percentile, July 2013.....	26
Figure 14. Idaho mean precipitation percentile, August 2013.....	27
Figure 15. Idaho mean precipitation percentile, September 2013.....	28
Figure 16. Idaho Palmer Drought Severity Index, July 2013.....	30
Figure 17. Idaho Palmer Drought Severity Index, August 2013.....	31
Figure 18. Idaho Palmer Drought Severity Index, September 2013.....	32
Figure 19. August 12, 2013—500 mb height contours indicating an Omega block and associated high-pressure ridge over Idaho (NOAA 2015).....	34
Figure 20. August 7, 2013—500 mb height contours indicating a weak Rex block and associated high-pressure ridge over Idaho (NOAA 2015).....	35
Figure 21. August 24, 2013—500 mb height contours indicating Ring of Fire block and associated high-pressure ridge over Idaho (NOAA 2015).....	36
Figure 22. PM _{2.5} historical fluctuations in Pinehurst, Idaho, 2004–2012.....	39
Figure 23. PM _{2.5} concentrations during the 2013 wildfires compared to previous years.....	42

Figure 24. PM _{2.5} ratios of Quarter 3 average for low-wildfire years compared to Q3 2013, for IMPROVE sites in the Pinehurst region. Error bars represent 95% confidence level. ...	45
Figure 25. Ratios of Quarter 3 to Quarter 2 (Q3/Q2) elemental carbon to PM _{2.5} fractions for 2013 compared to the average ratios for six low-wildfire years, for IMPROVE sites in the Pinehurst region. Q2 is the Spring, largely without fires, and Q3 the fire season. Error bars represent 95% confidence level.	46
Figure 26. The 500 mb height contours and wind barbs at 0500 MST, September 3, 2013 (NOAA 2015).	50
Figure 27. Surface weather analysis and station weather at 0500 MST, September 3, 2013 (NOAA 2015).	51
Figure 28. Aqua MODIS satellite image shows HYSPLIT model back trajectories intersecting visible smoke and HMS Analyzed Smoke polygons from the Rim fire in California. ...	52
Figure 29. Time series charts for September 3, 2013, showing 2013 PM _{2.5} concentrations versus historical (2010–2012) average and 95th percentile values for September days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation (bottom chart).	53
Figure 30. The 500 mb height contours and wind barbs at 0500 MST, July 31, 2013 (NOAA 2015).	55
Figure 31. Surface weather analysis and station weather at 0500 MST, July 31, 2013 ((NOAA 2015).	56
Figure 32. Terra MODIS satellite image showing fire detects and light smoke blanketing northern Idaho. HYSPLIT model back trajectories are short indicating stagnant air. ...	57
Figure 33. Time series charts for July 31, 2013, showing 2013 PM _{2.5} concentrations versus historical (2010–2012) average and 95th percentile values for July days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation (bottom chart).	58
Figure C-1. Burn management areas for the Crop Residue Burning Program.	119
Figure C-2. Prescribed fires in Idaho during wildfire period.	124
Figure D-1. Example of daily smoke outlook released by DEQ.	126
Figure D-2. Example 1: daily wildfire update.	127
Figure D-3. Example 2: daily wildfire update.	130

Executive Summary

To address high monitor values that result from natural exceptional events that are not reasonably controllable or preventable, the US Environmental Protection Agency (EPA) promulgated the Exceptional Events Rule (EER) in 40 CFR 50 and 51 (72 FR 13560) on March 22, 2007. The EER allows states to *flag* air quality data as *exceptional* and exclude those data from use in determining compliance with the National Ambient Air Quality Standards (NAAQS), if EPA concurs with the state's demonstration that it satisfies the rule requirements.

As required in the *Final Rule for the National Ambient Air Quality Standards for Particulate Matter* (78 FR 10), the Idaho Department of Environmental Quality (DEQ) will submit a letter recommending designation status for the particulate matter (PM)_{2.5} annual NAAQS for all areas in Idaho, outside the five Indian reservation boundaries. To designate Pinehurst as attainment/unclassifiable for the annual PM_{2.5} NAAQS, monitor values during the 2013 wildfire season that meet the criteria for exceptional events must be excluded.

Following the EER procedures, DEQ flagged values at the Pinehurst PM_{2.5} monitor and is requesting concurrence that certain flagged values (Table A) are exceptional events. The flagged values over 12 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) affect Idaho's compliance with the annual NAAQS. DEQ demonstrates in this report, and requests EPA concurrence, that these exceptional concentration values occurred as a result of primarily natural wildfires; they were not reasonably controllable or preventable by the State of Idaho; and they fully meet the EER criteria for excluding monitor values from the data used to determine compliance with NAAQS.

Table A summarizes the monitor values for Pinehurst for which DEQ is requesting EPA concurrence as caused by an exceptional event.

Table A. Monitor values for which DEQ is requesting EPA concurrence.

Date	24-hour Average PM _{2.5} (µg/m ³)
7/1/2013	26.8
7/2/2013	22.6
7/25/2013	12
7/26/2013	12.2
7/29/2013	13.6
7/30/2013	17
7/31/2013	16.8
8/1/2013	12.5
8/7/2013	13.3
8/8/2013	14.5
8/9/2013	13.7
8/10/2013	15.2
8/11/2013	18.1
8/12/2013	16.4
8/13/2013	13.1
8/15/2013	13.6
8/16/2013	13.3
8/24/2013	16.4
8/25/2013	12.9
9/2/2013	12.2
9/3/2013	12.7
9/4/2013	16.2
9/5/2013	13.4
9/14/2013	14.4

Required Elements of the Exceptional Events Rule

The EER requires that demonstrations to justify data exclusion as exceptional events shall provide evidence that the event (a) *affects air quality*; (b) *is not reasonably controllable or preventable*, (c) *is a natural event or is an event caused by human activity that is unlikely to recur at a particular location*; (d) *shows a clear causal relationship between the identified source and measurement under consideration*; (e) *shows the event is associated with measured concentrations in excess of normal historical fluctuations, including background*; and (f) *shows there would have been no exceedance or violation of the standard but for the event*. In addition, the state must document that prompt public notification procedures and measures to reduce public exposure were followed and that the public comment process was followed in reviewing the demonstration.

Report Organization

As shown in Table B, this report is organized by sections that address each element of the EER demonstration.

An exceptional events documentation package typically includes detailed descriptions of the weather conditions, source and transport conditions, and impact patterns for each monitor value and day in which concurrence is requested. Due to the large number of affected days, this approach is not feasible; however, DEQ observed that two transport scenarios occurred repeatedly in Pinehurst throughout the period affected by wildfires. DEQ describes the types of transport scenarios that occurred in detail with an example of each (section 4.4).

The complete listing of monitor values is provided in Appendix A. In Appendix B, detailed data are provided specific to each day being requested, and the transport discussion is supplemented by identifying the type of scenario or scenarios involved for each day followed by a brief but complete description of the evidence for that day. Appendix C contains crop residue burn decision summaries and prescribed fire data that relate to potential alternate sources of smoke. Appendix D provides an example of the daily monitoring, modeling, and satellite summary report provided by DEQ to federal, state and local agencies, including local health districts to ensure they had appropriate information to assist residents in taking protective actions. Appendix E provides the public comment period notification.

Table B. Summary of DEQ demonstration in this report meeting EER elements.

EER Element	Section	Summary
Conceptual Model (EPA guidance, not an EER element)	1	The conceptual model generally describes the wildfires and their origin, and summarizes sources, different kinds of weather systems, and transport flows combining to transport smoke from the wildfires to the affected monitor.
Not Reasonably Controllable or Preventable	2	Discussion of wildfire causes and that they are not reasonably controllable or preventable.
Exceeds Historical Fluctuations	3	Data provided: 1) Time series plots for multiple years, including the 2013 events. 2) Table of percentile values for each requested day at each monitor compared to annual data and fire season data for the previous 9 years (2004–2012). 3) 24-hour temporal charts for each day (Appendix B) showing hourly 2013 data affected by wildfire smoke versus 2010–2012 average and 95th percentile hourly values.
Clear Causal Relationship	4	For each transport scenario, a detailed example for 1 day is described in section 4.4. In Appendix B, data for each day are provided: 1) Description of how the specific data for the day support the scenario and explain how PM _{2.5} travelled to the monitor. 2) Time series of PM _{2.5} , wind speed, and wind direction at the monitor. 3) MODIS satellite images with HYSPLIT back trajectories showing paths from fires to monitors for every day requested. 4) Region-wide speciation data are provided in section 4.1, showing ubiquitous fine carbon aerosol throughout region in this period. 5) Alternate hypotheses are addressed by identifying nearby prescribed fires and crop residue burning.
Affects Air Quality	5	The element is met by demonstrating PM _{2.5} in excess of <i>historical fluctuations</i> and a <i>clear causal relationship</i> .
Natural Event or Human Activity Unlikely to Recur at the same location	6	The criterion is met by previous discussions that the fires are <i>natural events</i> , <i>not reasonably controllable or preventable</i> , and demonstration that there is a <i>clear causal relationship</i> between monitors and wildfire source areas.
No Exceedance But For This Event	7	A quantitative analysis is provided for each day in tables comparing the observed values to the average and 95th percentile values expected for this time of year. The estimated concentration <i>but for</i> the fires is computed by subtracting the observed value from the average and 95th percentile.
Mitigation	8	Complete daily informational reports are provided in Appendix D.
EER Procedural Requirements	9	DEQ met EER procedural requirements for flagging, demonstration, and public comment as summarized in this section.

Introduction

To address high monitor values resulting from natural exceptional events that are not reasonably controllable or preventable, the US Environmental Protection Agency (EPA) promulgated the Exceptional Events Rule (EER) in 40 CFR 50 and 51 (72 FR 13560) on March 22, 2007. The EER allows states to *flag* air quality data as *exceptional* and exclude those data from use in determining compliance with the National Ambient Air Quality Standards (NAAQS), if EPA concurs with the state's demonstration that it satisfies the rule requirements.

Following the EER procedures, the Idaho Department of Environmental Quality (DEQ) flagged values at the Pinehurst particulate matter (PM)_{2.5} monitor and is requesting concurrence that certain flagged values are exceptional events. The flagged values over 12 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) affect Idaho's compliance with the annual NAAQS. DEQ demonstrates in this report, and requests EPA concurrence, that these exceptional concentration values occurred as a result of primarily natural wildfires; they were not reasonably controllable or preventable by the State of Idaho; and they fully meet the EER criteria for excluding monitor values from the data used to determine compliance with NAAQS (Appendix A).

1 Conceptual Model

During the 2013 wildfire season in Idaho and in the surrounding regions, Pinehurst was affected from July through September. The weather conditions before the fire season and during the fires are discussed, and the conceptual models are provided for transport pathways between the wildfire sources and Pinehurst monitor.

1.1 Overview

Wildfires occur every year in the western United States, primarily in the summer and fall. The 2013 wildfire season was an average year in terms of acres burned (Figure 1). Over two million acres burned in Idaho and the surrounding states (NIFC 2013). Many western states had their warmest summer in over 100 years, and Idaho experienced its hottest summer on record. Dry fuel from continuing drought conditions in July and August plus lightning caused many uncontrollable wildfires throughout the west. Smoke from these fires negatively affected the air quality in Pinehurst.

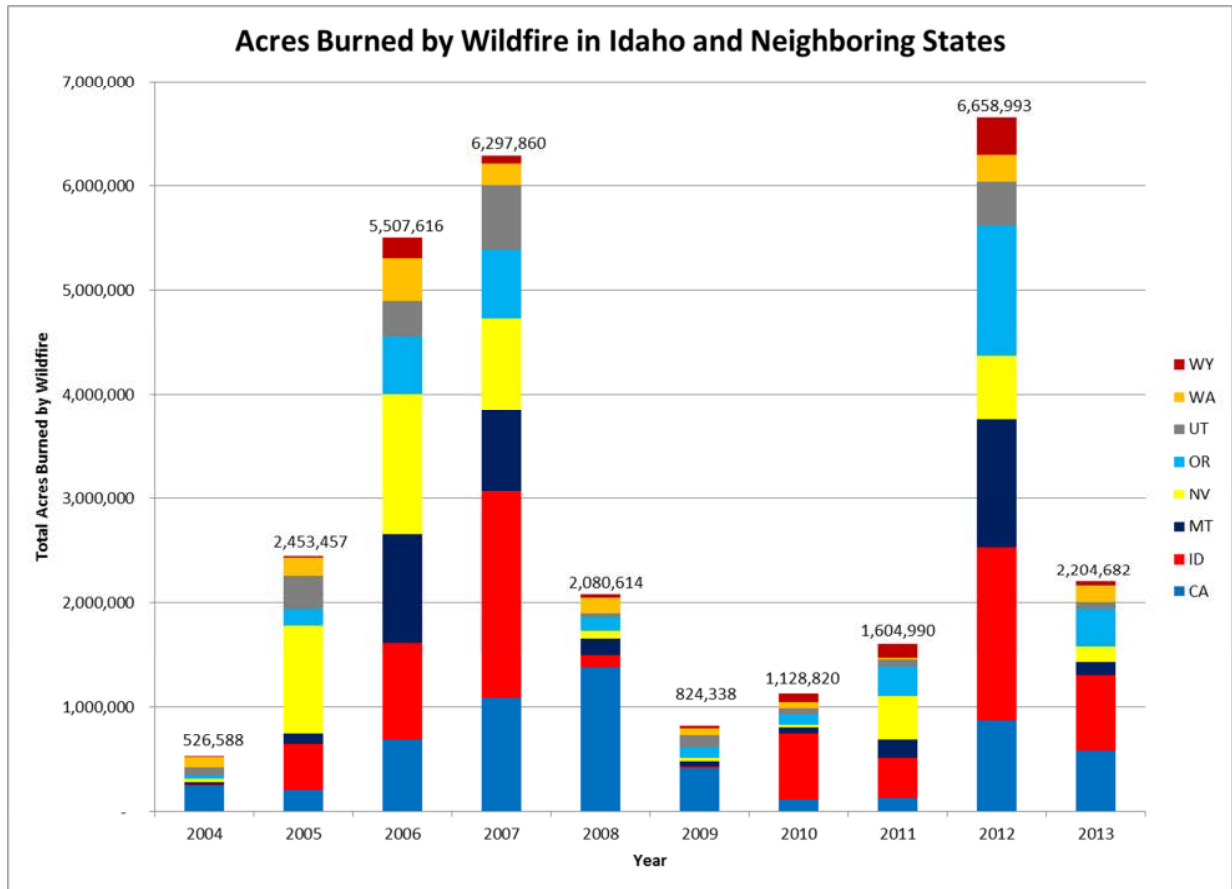


Figure 1. Acres burned by wildfires in Idaho and surrounding states, 2004–2013 (NIFC 2013).

1.2 Source Area and Affected Region

The fires directly influencing Idaho during the period when exceptional events affected Idaho monitors are shown in Figure 2, a map of the satellite fire detects in the region. The Pony, Elk, and Beaver Complexes, in south-central Idaho, all ignited by lightning, burned nearly 400,000 acres combined (NWCG 2015). The Gold Pan Complex, straddling the Idaho/Montana border in the Bitterroot National Forest, burned in heavy timber for 3 months. The central Washington Colockum Tarps fire, directly upwind of Pinehurst when winds are zonal, burned 80,000 acres. Finally, the Rim fire in Yosemite National Park, burned big and hot (257,314 acres) for 2.5 months, sending large plumes to the northeast on southwesterly winds. Central Oregon also had a number of large fires that affected Pinehurst, including Sunnyside Turnoff and the Douglas Complex.

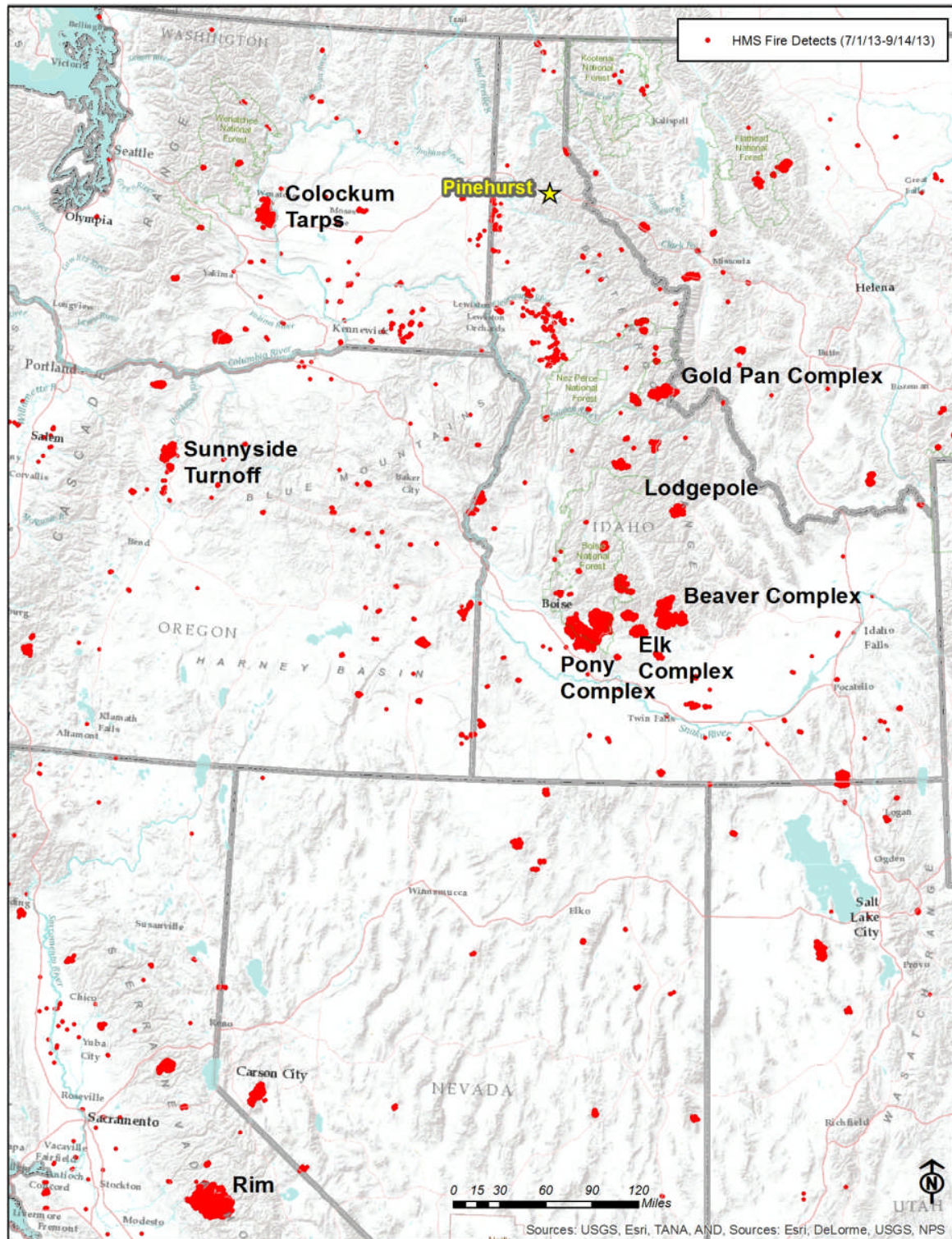


Figure 2. Fires active in the Northwest during the approximate period of exceptional events, July 1, 2013, to September 14, 2013. Significant fires are labeled, and the Pinehurst monitor location is denoted by the yellow star.

1.3 Emissions

Wildfires produce significant quantities of smoke, and while it is difficult to determine exact quantities, wildfire emissions can be approximated. In addition, emissions from all other sources in Idaho have been recently estimated as part of the 2011 National Emissions Inventory (NEI) (EPA 2013a). Wildfire PM_{2.5} emissions for Idaho were estimated using EPA and Western Regional Air Partnership emission factors (Air Sciences, Inc. 2005) to total 33,055 tons in 2013 based on 722,204 acres burned, most of it occurring from July through September. If the 2013 annual wildfire emissions are averaged over the period July 2 through September 14 to estimate a period-average daily PM_{2.5} emission quantity, we arrive at an average of 441 tons per day. This daily average wildfire emission estimate is shown in Figure 3, in comparison to all other normal emission source categories in Idaho from the 2011 NEI. Each value shown is an annual average divided by an approximate number of days that the source may occur. This approach allows an approximate comparison, although from different years. The comparison in Figure 3 makes it clear that 2013 wildfires produced many times more PM_{2.5} on a daily basis than all anthropogenic source categories in a typical year.

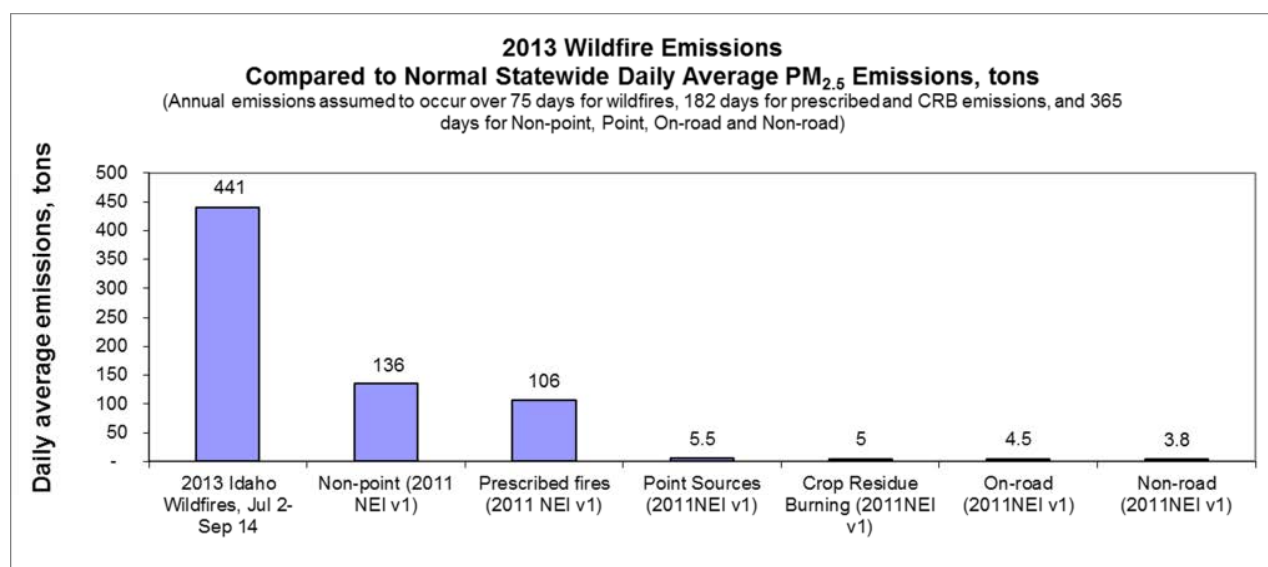


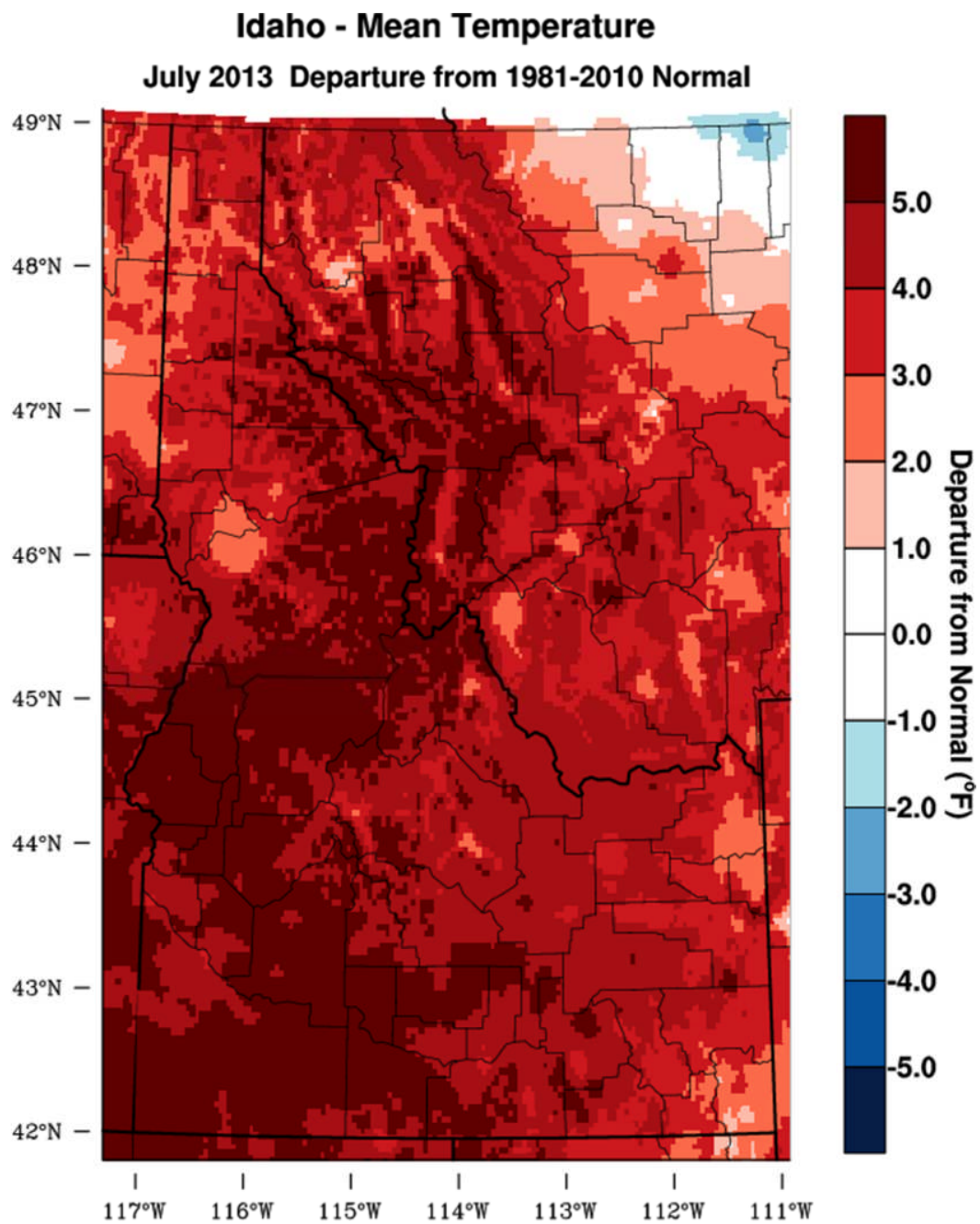
Figure 3. Average daily wildfire emissions for the period July 2 through September 14, 2013, compared to other source categories from all anthropogenic emissions from the 2011 National Emission Inventory (EPA 2013a).

1.4 Contributing Weather Phenomena

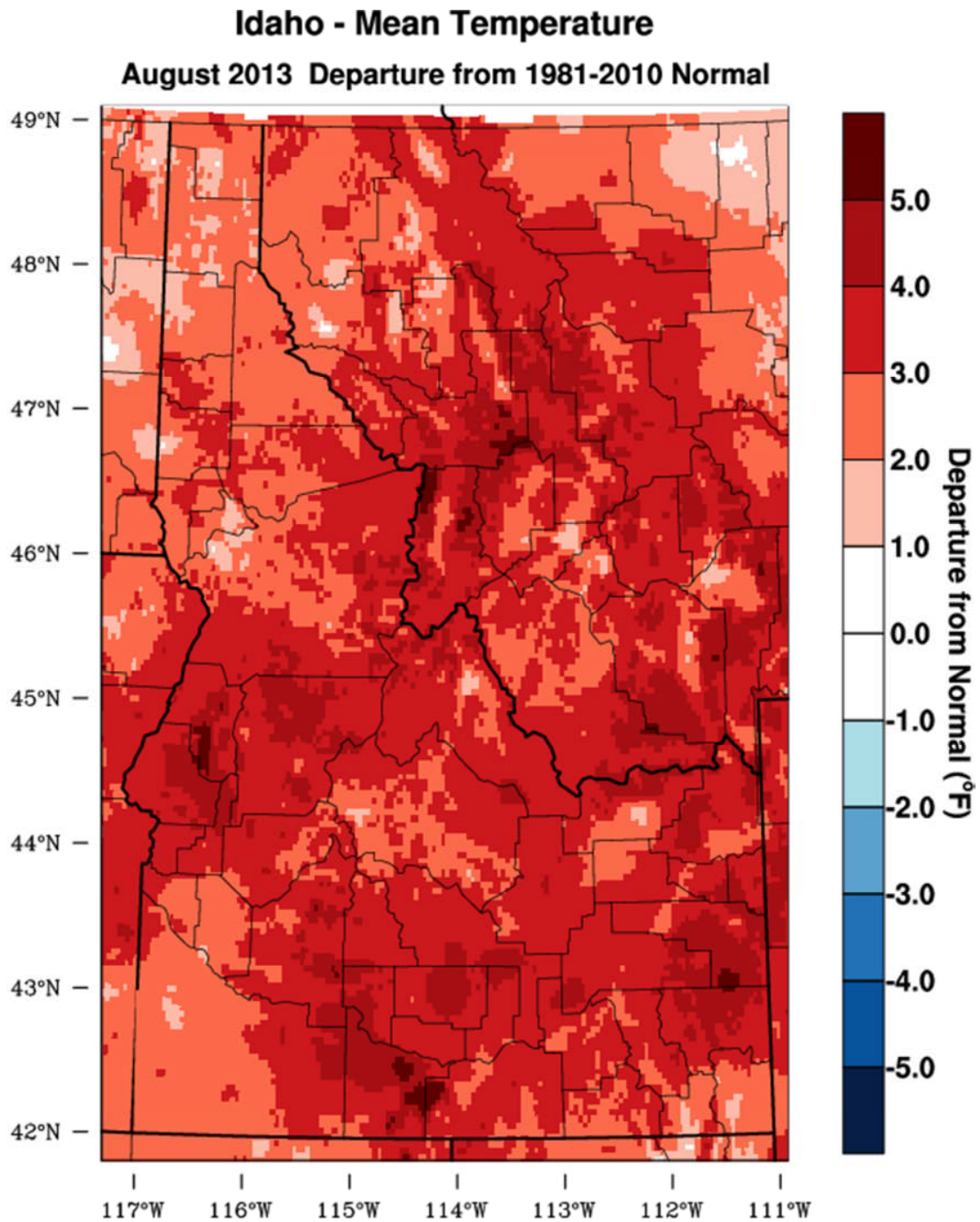
1.4.1 Temperatures

Most of the summer saw a consistent ridge of high pressure over the western United States, which allowed eight western states to experience their warmest summers in 119 years. Idaho had its warmest summer on record. Drought continued across the western United States, particularly across much of the northern Rockies, Great Basin, and California. By July, fuel conditions across southwestern Oregon and northern California had approached conditions similar to the 2002 and 2008 fire seasons. In August, dry air moved into the interior portions of the west, including

Idaho, eastern Oregon, western Montana, and Washington. This movement amplified already dry fuel conditions and increased the energy release component to above the 97th percentile. Most of the fires occurred in the northern fringes of the Great Basin as fuel loading was not limited as it was in the central and southern Great Basin. Idaho experienced its warmest September on record along with six other interior states spanning the northern Rockies to the upper Midwest (NIFC 2013). Figure 4—Figure 6 indicate the widespread above-normal temperatures across all of Idaho in July and August and the near-to-above normal temperatures across the state in September. In July and August, a majority of the state experienced temperatures in the top 90th percentile with some spots achieving the warmest on record (Figure 7 and Figure 8). Temperatures moderated when compared to September with most of the state experiencing temperatures above normal, ranging from the 67th to 90th percentile (Figure 9).

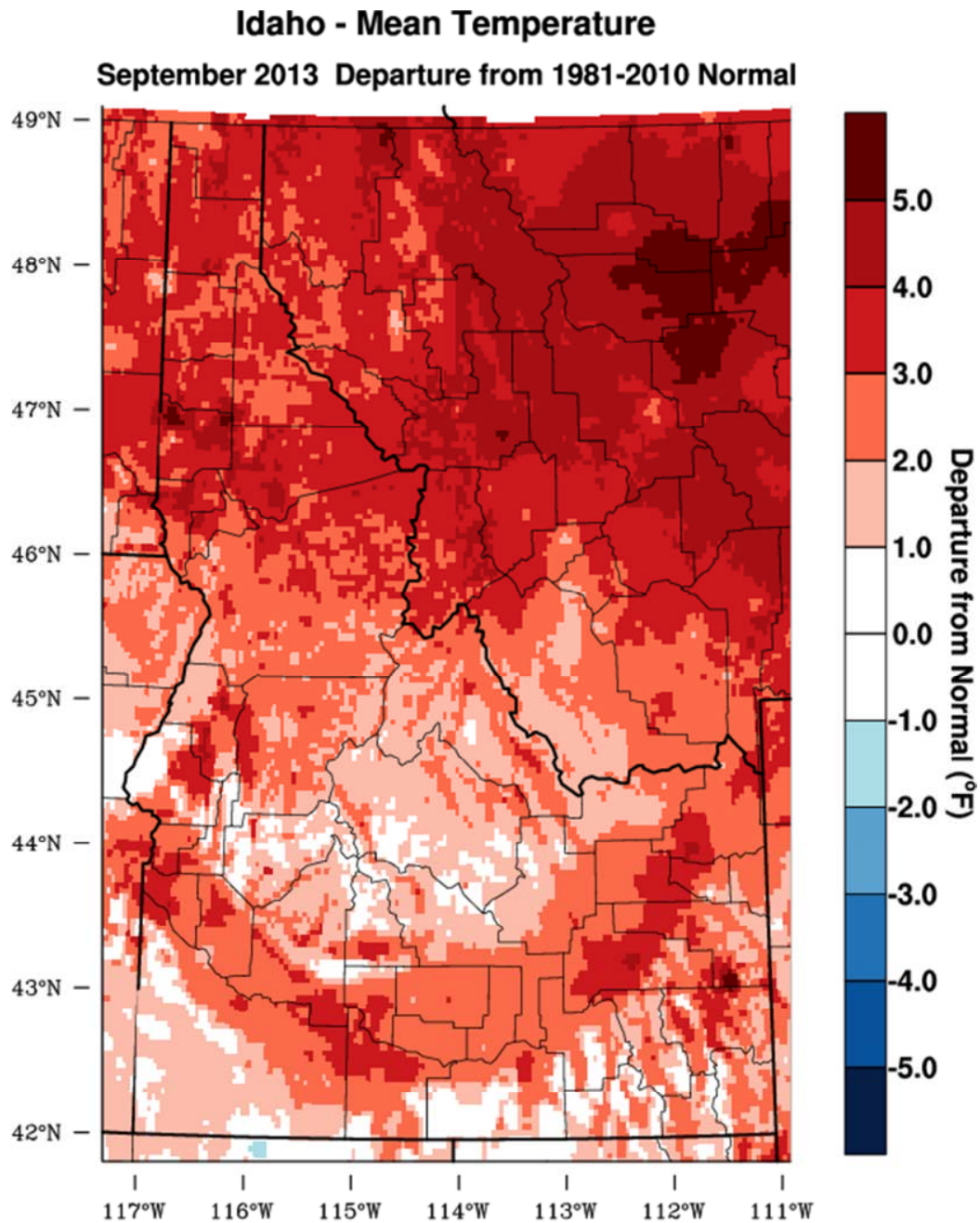


WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 11 MAR 2014
Figure 4. Idaho mean temperature anomaly, July 2013.



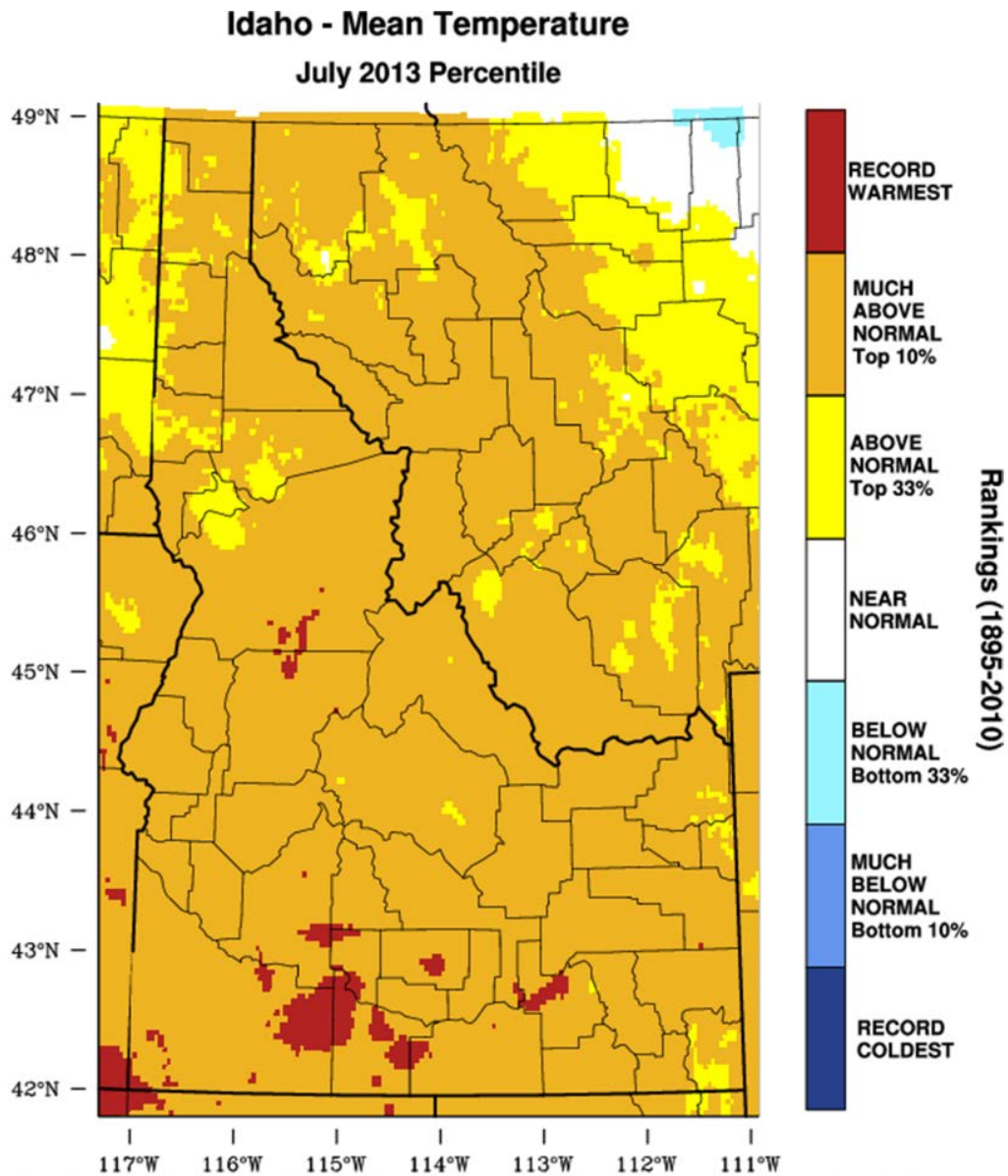
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 11 MAR 2014

Figure 5. Idaho mean temperature anomaly, August 2013.



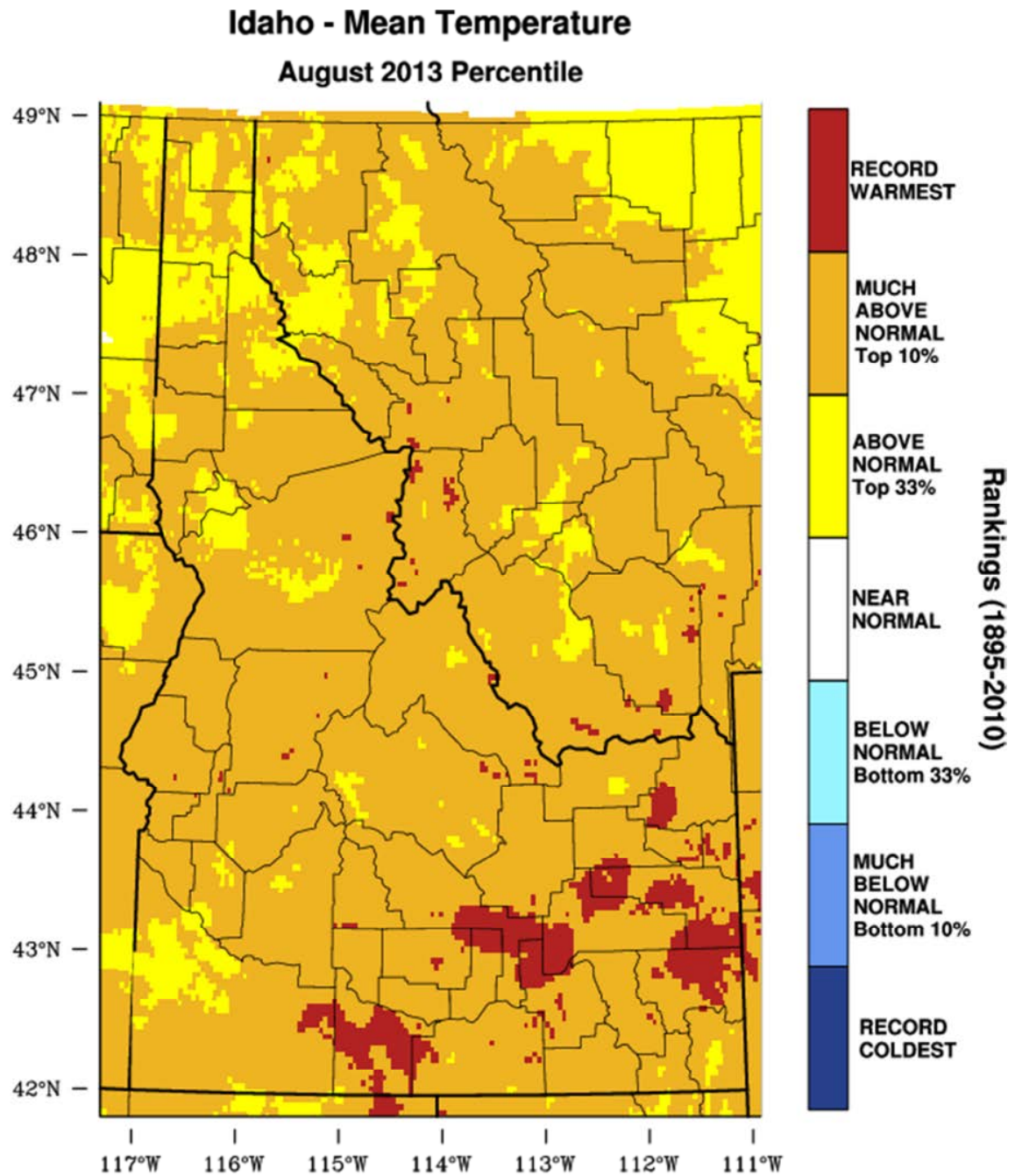
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 11 MAR 2014

Figure 6. Idaho mean temperature anomaly, September 2013.



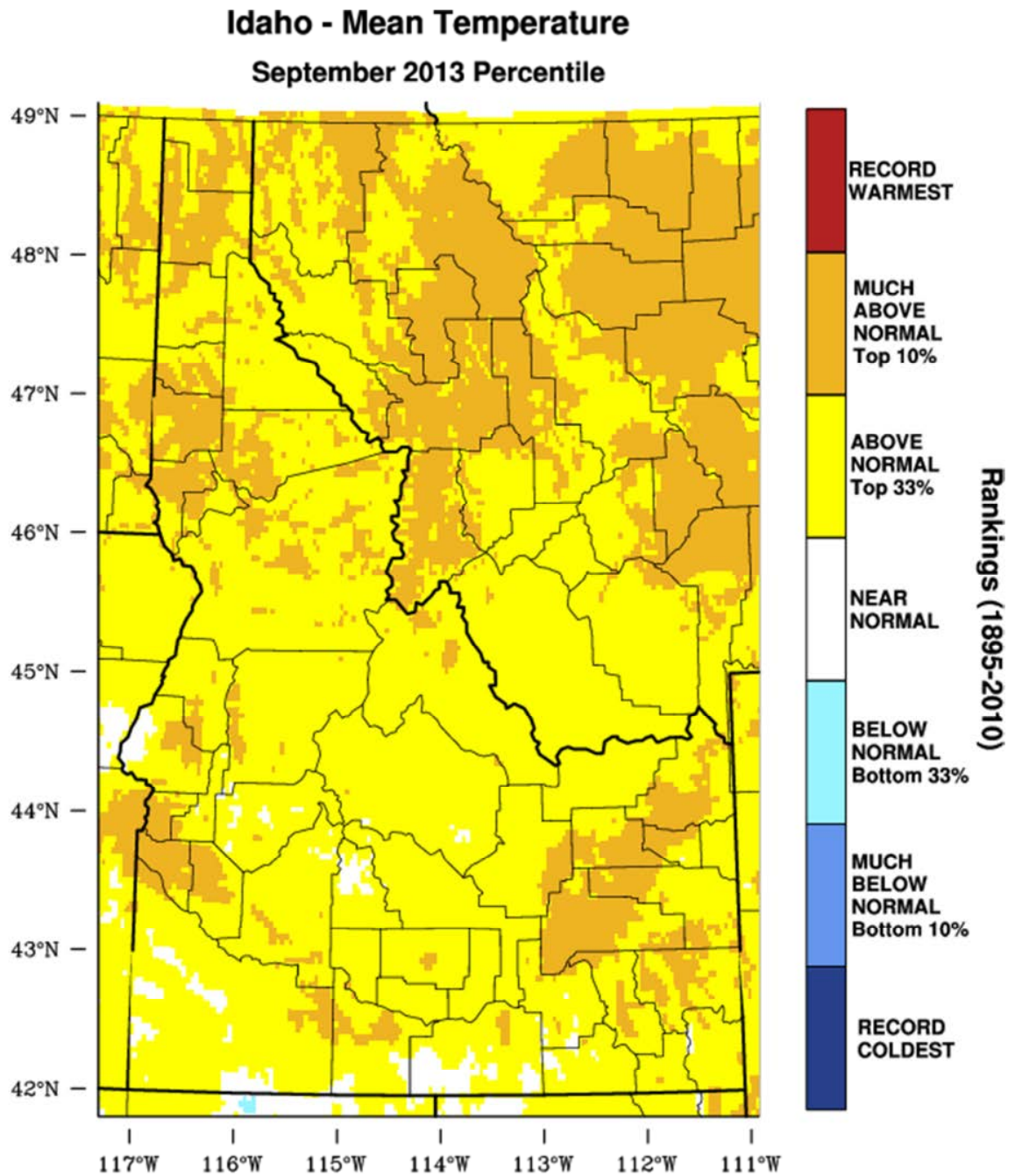
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 12 MAR 2014

Figure 7. Idaho mean temperature percentile, July 2013.



WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 12 MAR 2014

Figure 8. Idaho mean temperature percentile, August 2013.

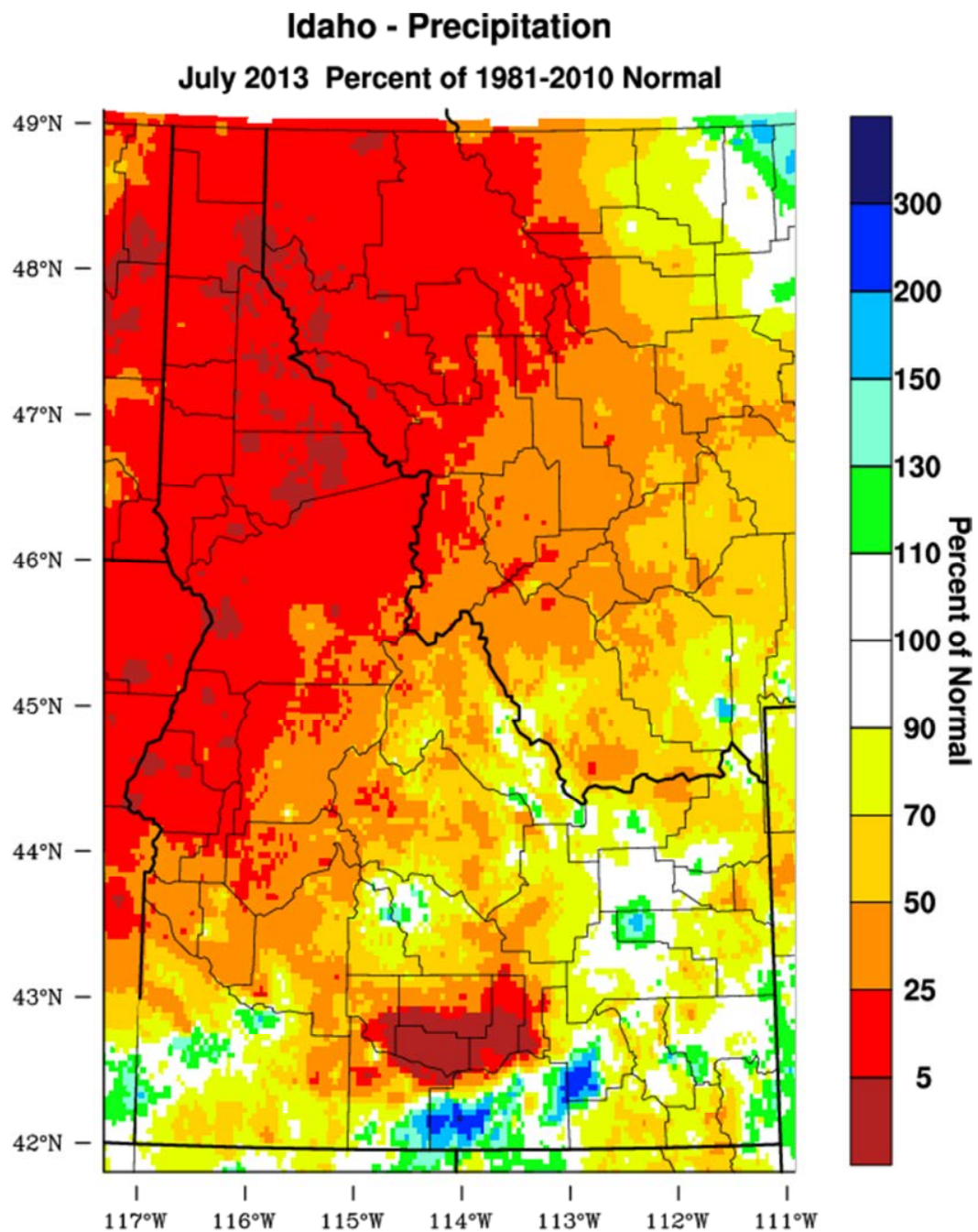


WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 12 MAR 2014

Figure 9. Idaho mean temperature percentile, September 2013.

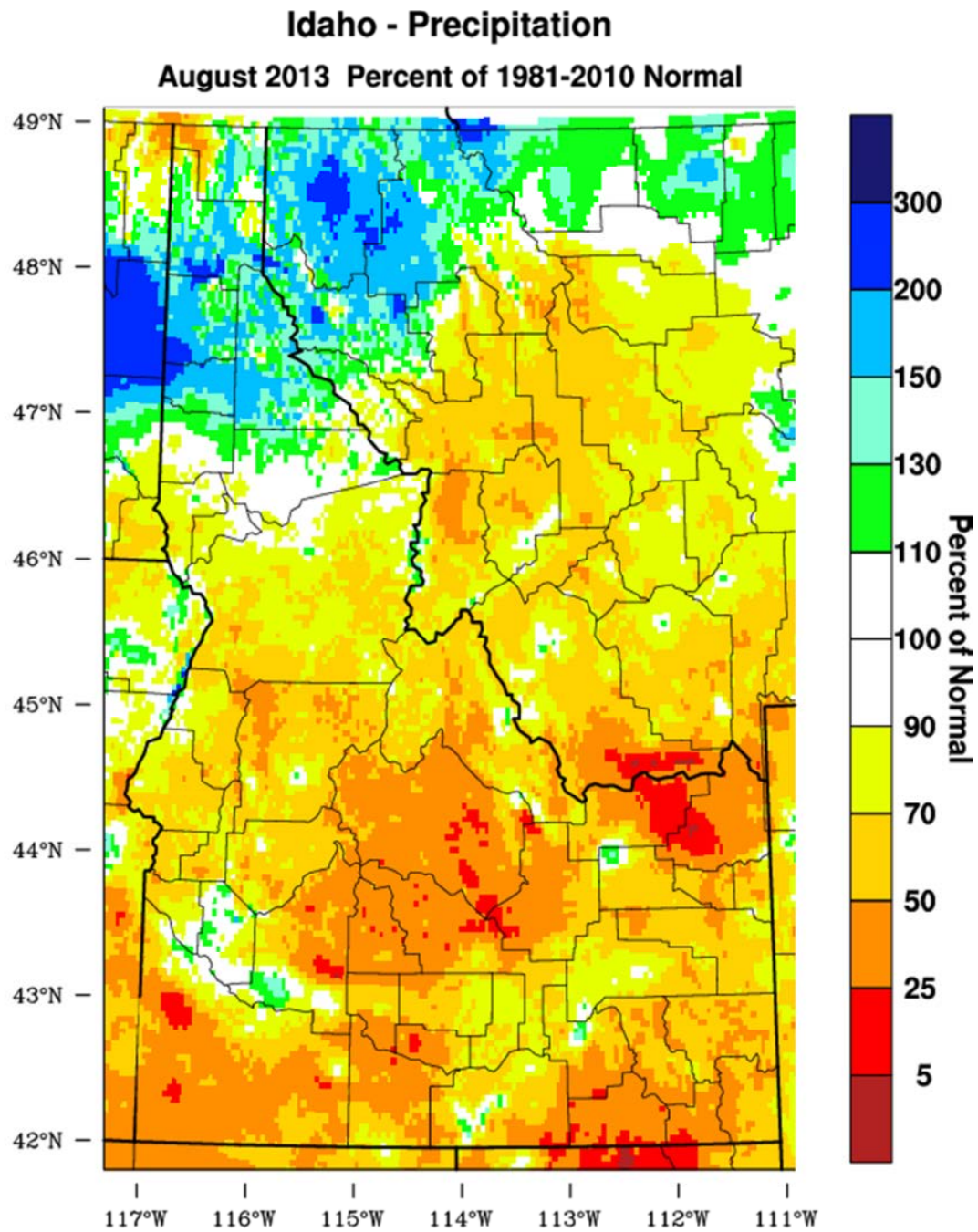
1.4.2 Precipitation

Typical summer precipitation patterns across Idaho vary by location but generally follow a minimum across the northern and western portions of the state while the eastern portions receive more than 50% of their annual precipitation between April and September (WRCC 2013). Both June and July were quite dry for Idaho and neighboring states. Utah experienced the driest June on record, and Oregon experienced the driest July on record. Idaho experienced its wettest September on record, which quickly moistened fuels across the northwestern portion of the United States (NIFC 2013). In July, much of the state received below normal amounts of precipitation, particularly along the western and northern portions of the state while the remainder of the state saw near-normal conditions that month (Figure 10). Precipitation patterns in Idaho were below normal for August across the state except in the northern Panhandle, where summer storms along the US-Canadian border brought precipitation amounts of 110%–300% of normal (Figure 11). September brought above normal precipitation to the entire state with regions along the west and north receiving values of 300% or higher than normal (Figure 12). As expected with such high values, most of the state ranged from the 67th percentile to the 90th percentile in precipitation amounts received during July through September (Figure 13–Figure 15).

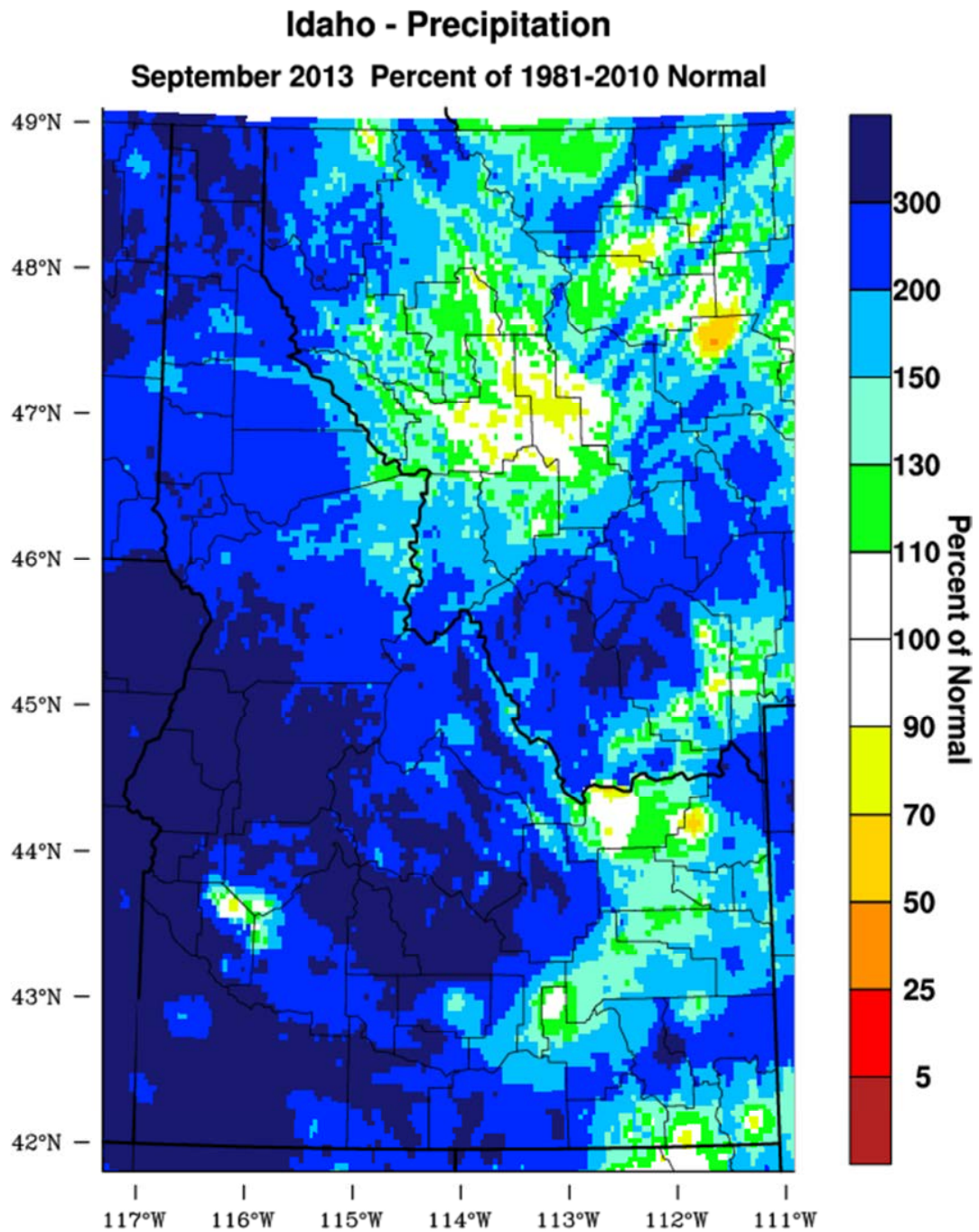


WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 22 AUG 2013

Figure 10. Idaho precipitation anomaly, July 2013.

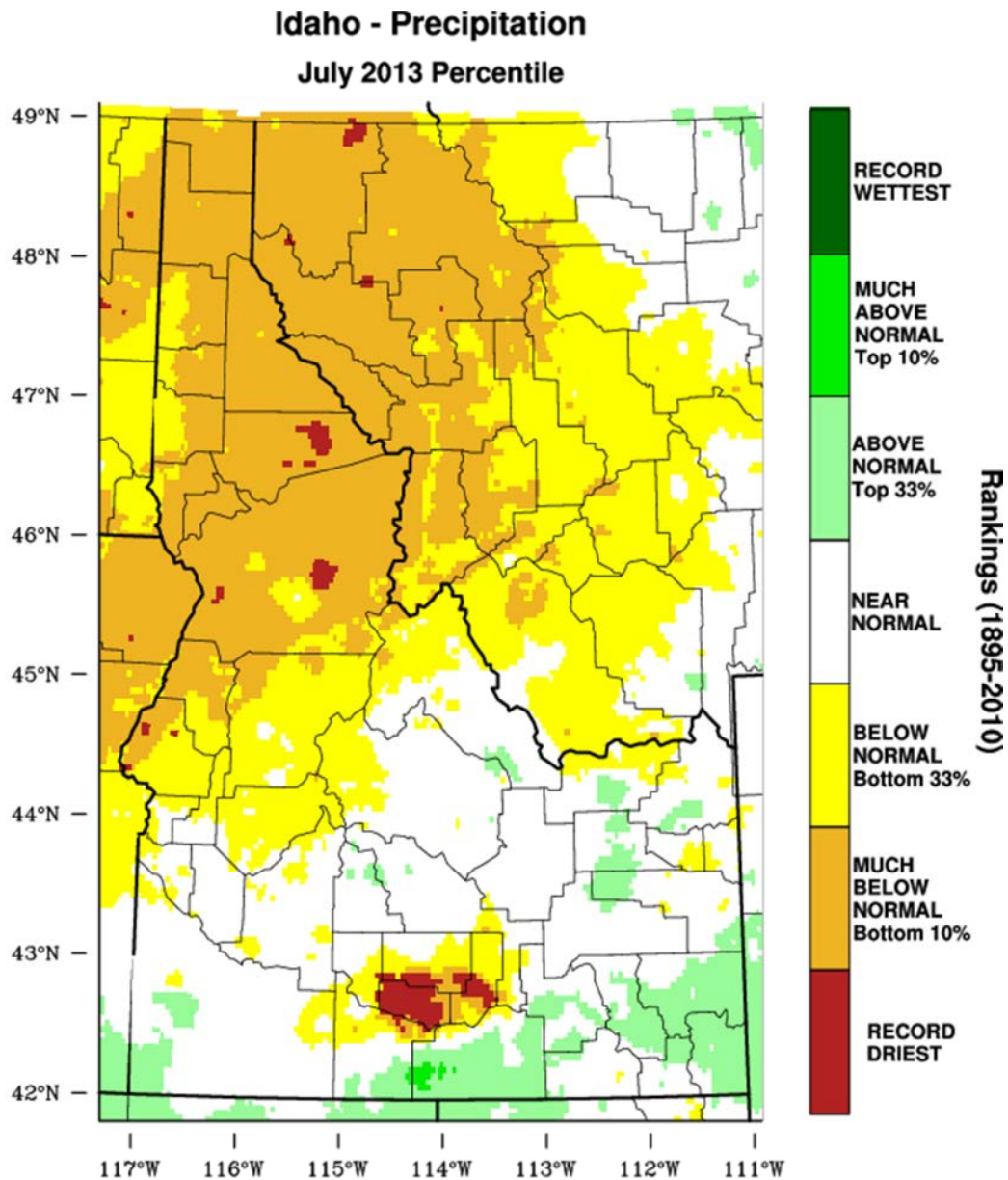


WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 22 SEP 2013
Figure 11. Idaho precipitation anomaly, August 2013.



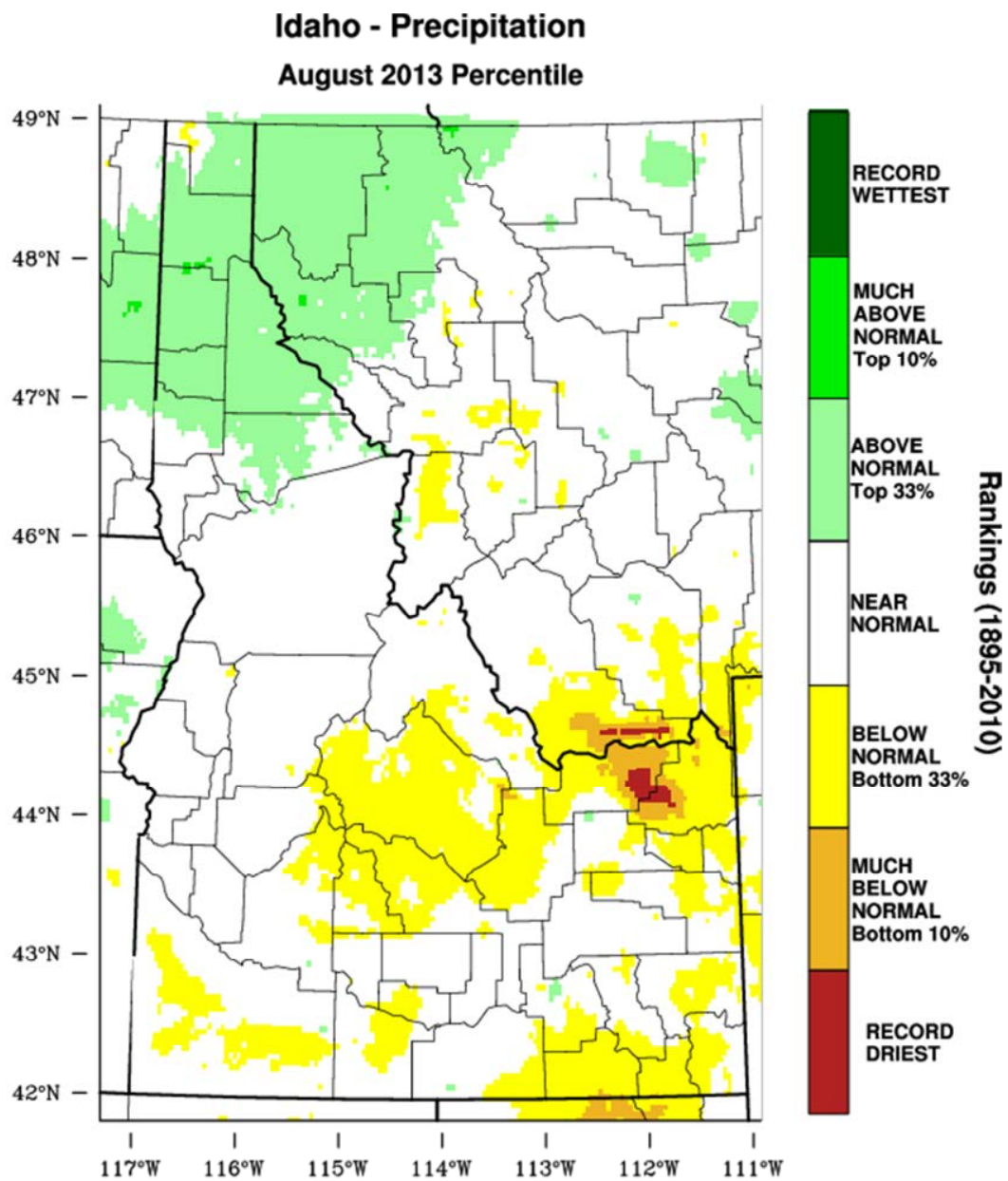
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 22 OCT 2013

Figure 12. Idaho precipitation anomaly, September 2013.



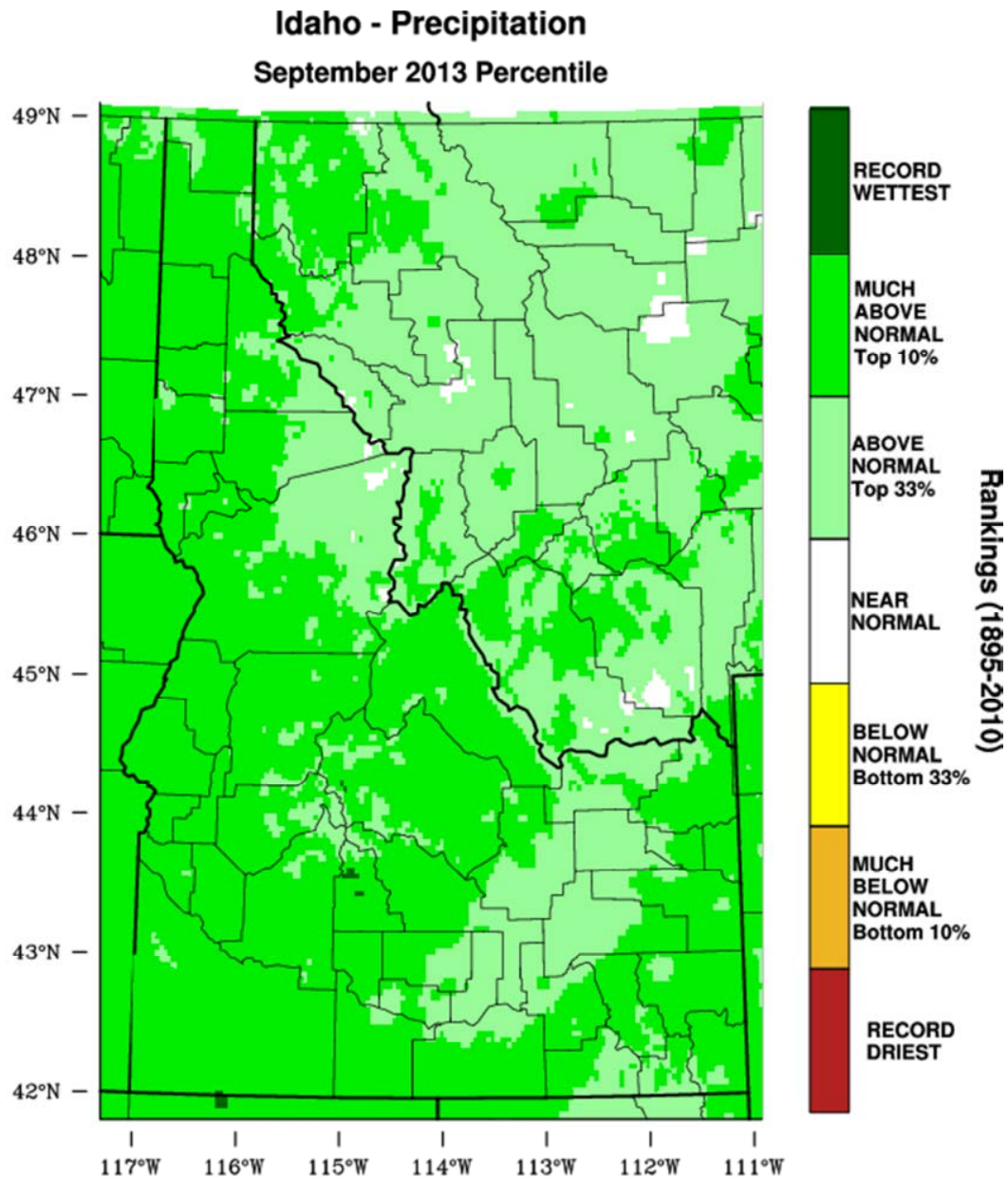
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 17 MAR 2014

Figure 13. Idaho mean precipitation percentile, July 2013.



WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 17 MAR 2014

Figure 14. Idaho mean precipitation percentile, August 2013.

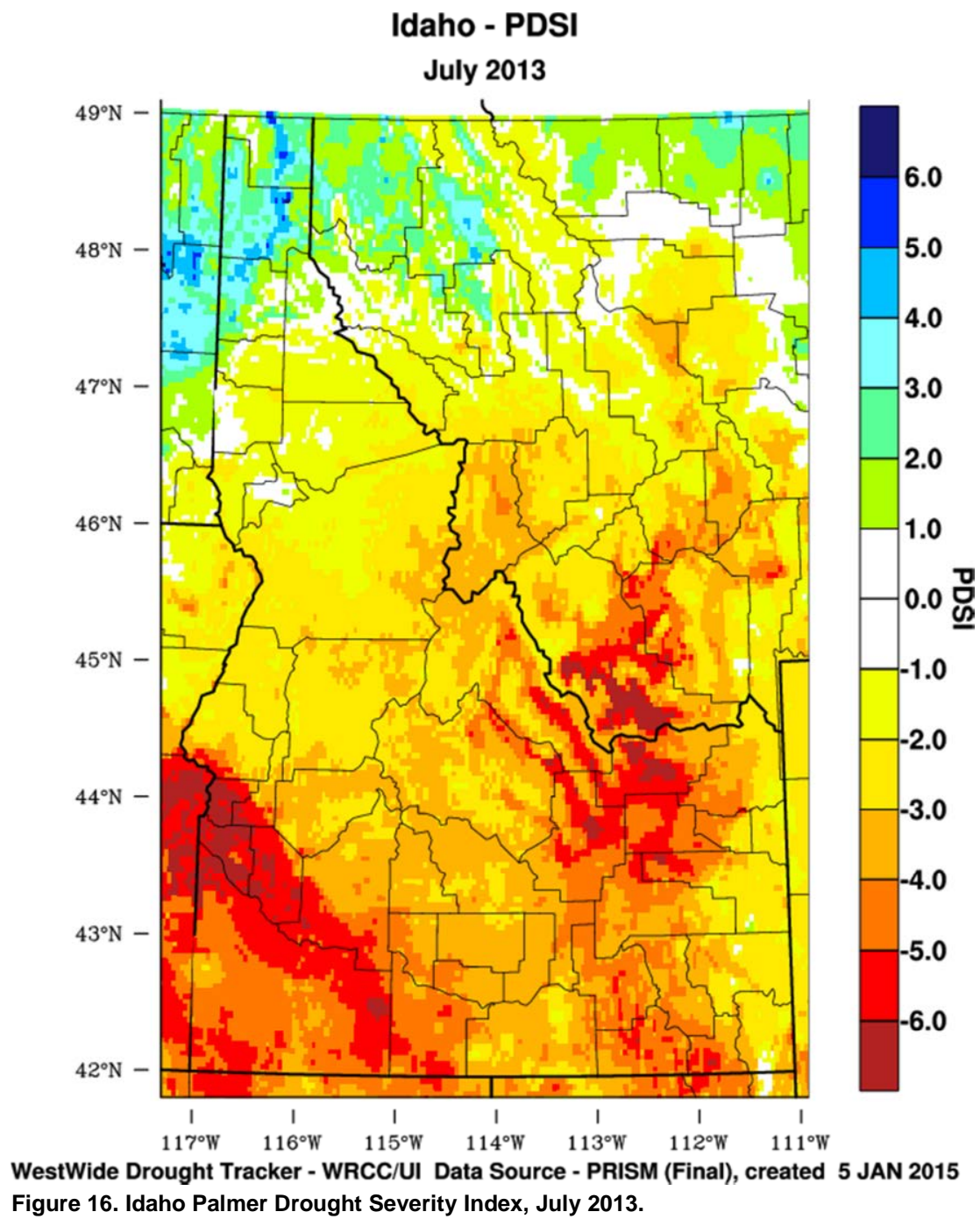


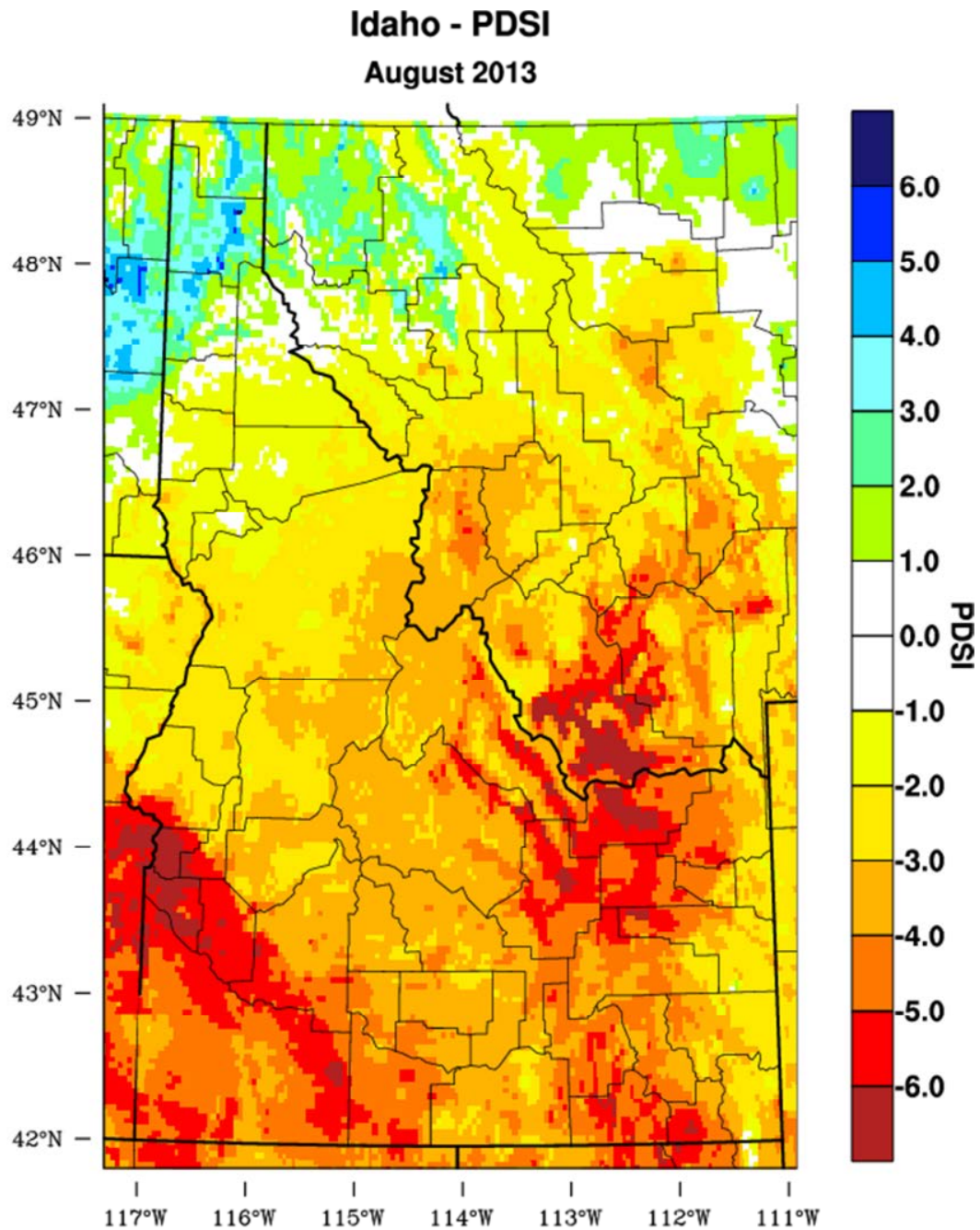
WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 17 MAR 2014

Figure 15. Idaho mean precipitation percentile, September 2013.

1.4.3 Drought

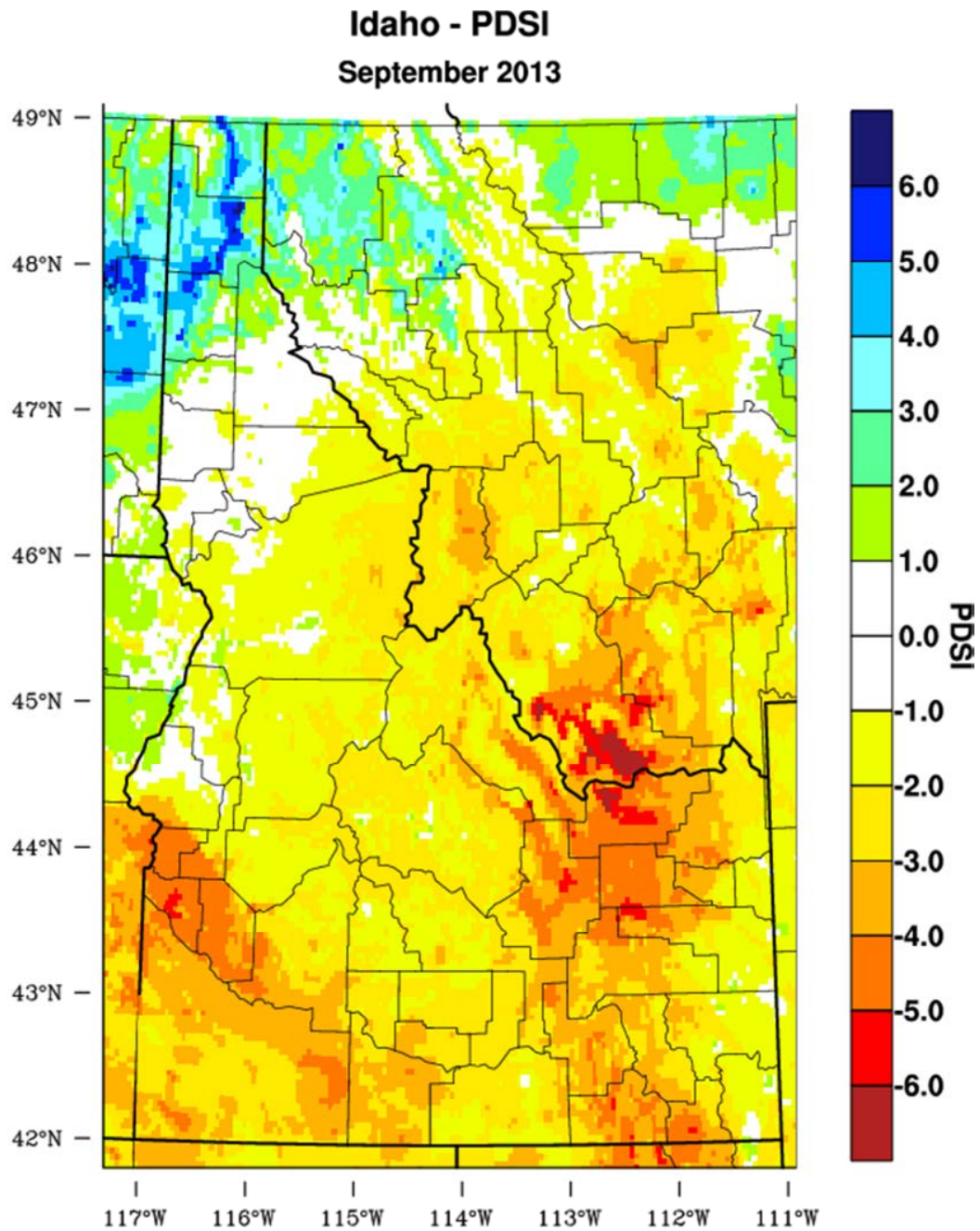
Most of Idaho was under both long- and short-term drought conditions in July and August except in the northern Panhandle where wet Palmer Drought Severity Index (PDSI) values of +1 and +2 were observed. The precipitation received in the later months in the Panhandle helped to alleviate some of the short-term drought, but the long-term drought persisted. Southwestern Idaho experienced the highest levels with a PDSI of -6 or lower (the more negative a value is, the more severe the drought characteristics are), while all of southern Idaho met the requirements for severe (-2 or lower) drought (Figure 16 and Figure 17). The anomalously high precipitation values during September served to reduce the intensity of the drought conditions, but these conditions persisted into autumn as indicated by Figure 18.





WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 5 JAN 2015

Figure 17. Idaho Palmer Drought Severity Index, August 2013.



WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Final), created 5 JAN 2015

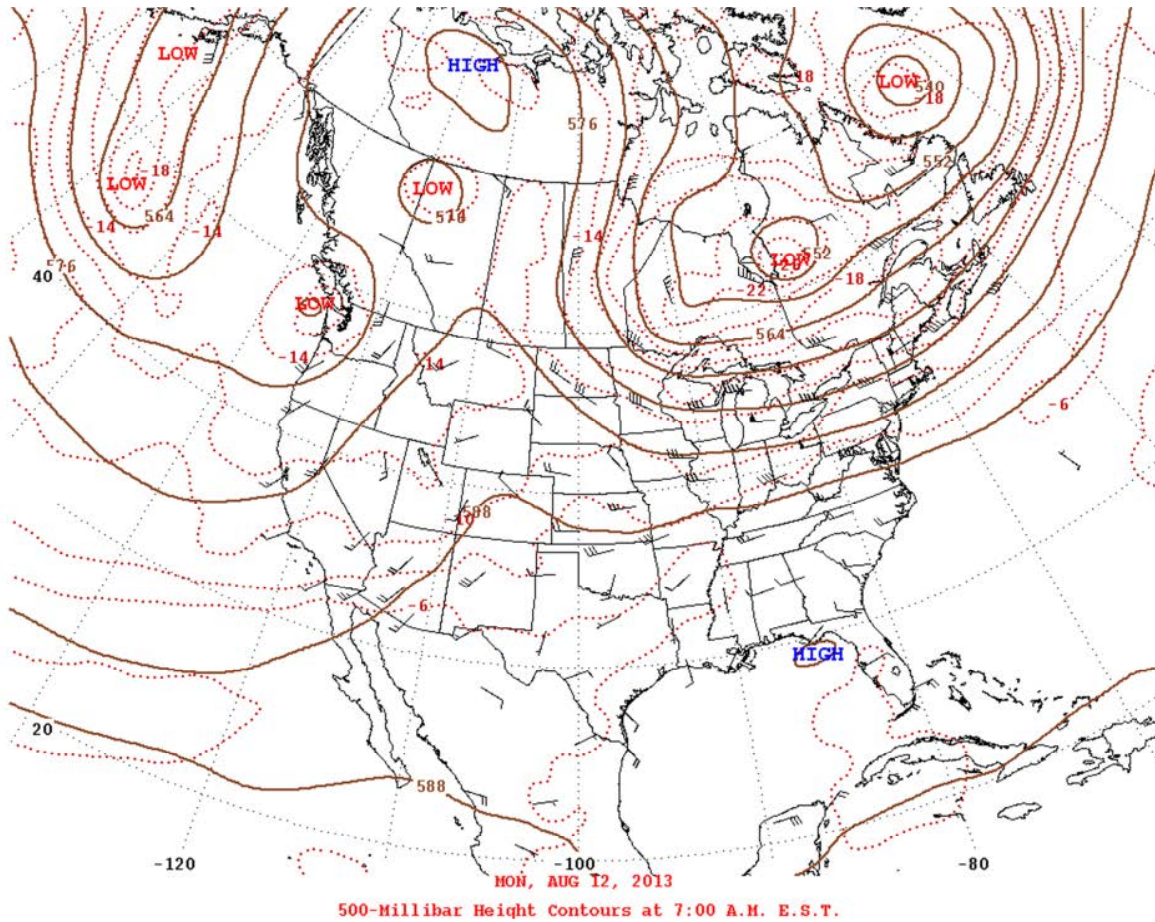
Figure 18. Idaho Palmer Drought Severity Index, September 2013.

1.4.4 Transport Weather Conditions

During the summer months in the northeastern Pacific Ocean, a semipermanent high-pressure system known as the North Pacific High reaches its apex of strength and forces the polar jet to the north of the continental United States and the tropical jet to the south. During the 2013 fire season, this quasistationary high-pressure system provided Idaho with consistent stagnant ridges of high pressure or blocking patterns (most common were the Rex block and Omega block) that limited zonal transport of the mid- and upper-level air masses. Typical patterns that affected Idaho during summer 2013 included amplification of shortwave ridges by Aleutian low-pressure systems tracking south along the eastern Pacific Coast where they became cut off from the jet stream and either retrograded or remained quasistationary along the region from California to Washington. On occasion, this sequence of events aligned with an upper-level low over Hudson Bay, which created an Omega block with Idaho under or near the ridge axis.

Another sequence of events that occurred several times over the summer was the development of a Rex block along the eastern Pacific, which created a region of low-level divergence over Idaho, and limited winds, vertical mixing, and zonal transport. These blocking patterns limited vertical and zonal wind transport and are generally associated with subsidence, which is known for the warming properties that limit vertical mixing. Also notable was the potential role of the incumbent smoke in limiting daytime heating from insolation, and by proxy, the ultimate height of the transport layer, which is driven by thermal mixing under such stagnant regimes.

Figure 19, Figure 20, and Figure 21 represent examples of the upper-level (500 millibars [mb]) atmosphere across the continental United States at two separate dates during summer 2013; these were selected to illustrate the blocking patterns that frequently impact the Pacific Northwest and Intermountain West in the summer. It is possible to see the developed Omega block with ridge axis slightly east of Idaho in Figure 19. Figure 20 represents a Rex block pattern located offshore that forces strong ridging over Idaho. Such blocking patterns create stagnant atmospheric conditions with light wind speeds through the mixed layer and low mixing heights. As such, diurnal wind regimes typically become the primary wind direction mechanism. Figure 21 indicates a Ring of Fire blocking pattern with a high-pressure system located over the southeastern United States, which forced ridging over the western portions of the United States. This ridging typically intensified over Idaho when a cut-off low dropped south from British Columbia along the Pacific Coast toward California.



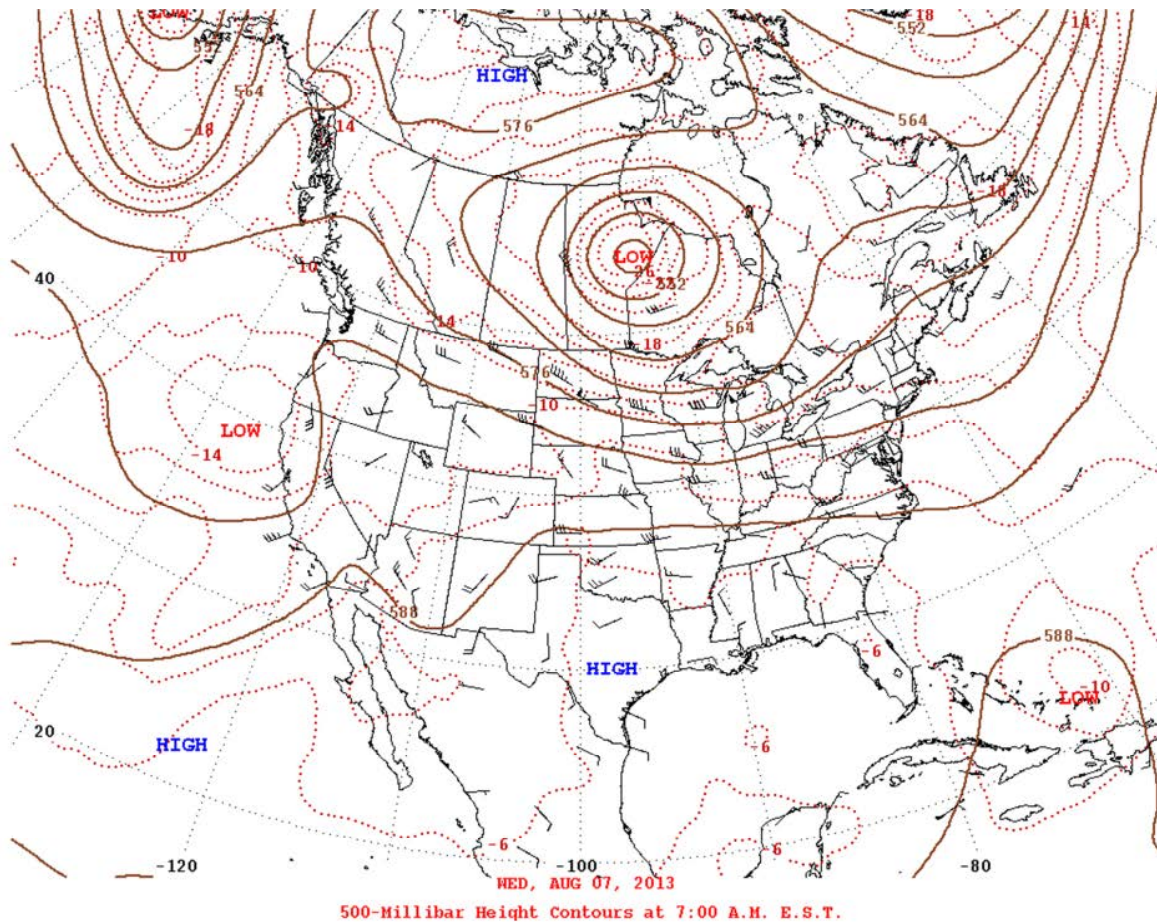


Figure 20. August 7, 2013—500 mb height contours indicating a weak Rex block and associated high-pressure ridge over Idaho (NOAA 2015).

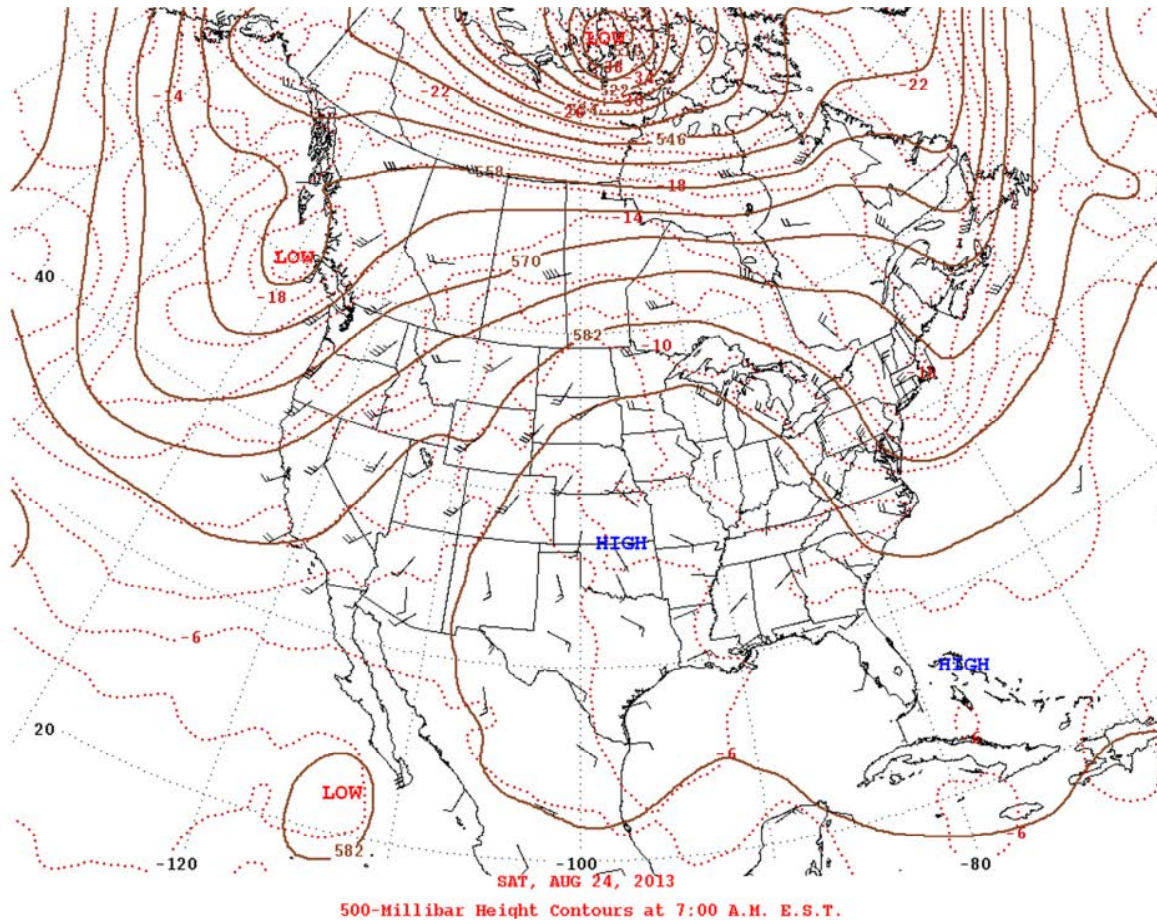


Figure 21. August 24, 2013—500 mb height contours indicating Ring of Fire block and associated high-pressure ridge over Idaho (NOAA 2015).

1.5 Path and Timeline from Source Area to Monitors

At a conceptual level, the types of transport patterns observed by DEQ can be categorized into two models: regional transport and local stagnation. Each type of smoke transport from source to monitor was observed to occur repeatedly throughout the wildfire season in Pinehurst. The transport patterns are a way to group the individual days requested for concurrence into identifiable transport regimes. On many days, both mechanisms may have played a part in moving smoke to the Pinehurst monitor. This section describes the transport patterns at a conceptual level. Section 4.4 describes the scenarios in detail with an example day for each, along with the accompanying evidence.

1.5.1 Regional Transport Conceptual Model Description

The regional transport scenario describes a mechanism whereby smoke advects from region-wide fires to the Pinehurst monitor. The smoke is carried on the prevailing winds from the source. A plume may directly advect toward the monitor, or back trajectories originating in Pinehurst may intersect the smoke plume, indicating that air parcels containing the smoke were

carried to the monitor. On any day where this scenario was observed, smoke may originate from one or more fires burning in Idaho or in other states.

1.5.2 Local Stagnation Conceptual Model Description

The local stagnation scenario is a more passive regime whereby smoke already in Pinehurst or nearby is trapped in the Pinehurst airshed by high pressure and subsidence. Typical conditions that bring about this scenario include high pressure, ridging, and weak winds. Atmospheric conditions are stable and visible smoke can sometimes be detected trapped deep in river valleys. Back trajectories typical of this scenario are short, indicating low winds speeds.

2 Not Reasonably Controllable or Preventable

2.1 Source Areas Contributing to the Event

This section demonstrates that the exceptional events were not reasonably controllable or preventable. The primary wildfires impacting Pinehurst were managed under suppression strategies, either full suppression or point or zone protection. Section 4.3 evaluates whether other types of PM_{2.5} sources, such as prescribed burning, could have caused or contributed significantly to the elevated concentrations on the requested days. Section 8 discusses the mitigation measures DEQ implemented to notify the public of deteriorating air quality as well as to control other sources of PM_{2.5} emissions.

The primary fires influencing the Pinehurst, Idaho, PM_{2.5} concentrations were the Rim fire in California, Colockum Tarps fire in Washington, Sunnyside Turnoff fire in Oregon, and Gold Pan Complex in Idaho. Many other fires in the region likely contributed to concentrations at various times. Table 1 shows the start and end dates for each fire (NIFC 2013). Additional fires over 40,000 acres are listed in Table 1 because they all contributed to regional smoke and are considered partial contributors.

Table 1. Wildfires in 2013 greater than 40,000 acres contributing to Idaho smoke.

Name	State	Start Date	Contain or Control Date	Size (Acres)	Cause	Estimated Cost (\$)	Management Strategy ^a
Rim	CA	8/17	10/24	257,314	Undetermined	127,350,000	Full suppression
Pony Complex	ID	8/9	8/19	157,747	Lightning	4,000,000	Full suppression
Elk Complex	ID	8/9	8/31	131,258	Lightning	10,720,000	Full suppression
Beaver Creek	ID	8/7	9/2	111,490	Lightning	26,500,000	Full suppression
Colockum Tarps	WA	7/27	8/18	80,184	Human	11,000,000	Full suppression
Sunnyside Turnoff	OR	7/20	9/3	51,340	Human	4,000,000	Full suppression
Douglas Complex	OR	7/26	10/18	48,679	Lightning	55,000,000	Full suppression
Owyhee	OR	7/1	7/8	46,559	Lightning	1,843,801	Full suppression
Gold Pan Complex	MT	7/16	10/3	43,429	Lightning	11,860,878	Point or zone protection

a. NWCG 2015

2.2 Basic Controls Analysis

Based on the information provided in Table 1, lightning caused the three largest wildfires in 2013 that are under Idaho's jurisdiction. Of the other fires in upwind states that impacted the concentrations at Pinehurst, three were caused by lightning, two were ignited by a human, and one had an undetermined cause.

The responsible agencies did their reasonable best to control the extent of these fires, as indicated by the funds spent to fight these fires (Table 1). All the large fires were managed under a full suppression strategy, except for the Gold Pan Complex, which was managed under a point or zone protection strategy. Full suppression aims to “put the fire out as efficiently and effectively as possible, while providing for firefighter and public safety” (NWCG 2015). Point or zone suppression aims to protect areas of high resource value, such as communities, homes, or communication sites, while not actively trying to line the entire fire edge (NWCG 2015). Both strategies imply major efforts and resources expended to control the fire. As indicated by the management strategies and costs expended to fight each fire, the responsible agencies did their reasonable best to fight these fires (Table 1).

Therefore, it is clear that emissions from these wildfires were not reasonably controllable or preventable because all the fires were managed by Federal Land Managers under a form of suppression strategy (full suppression or point or zone protection) and a tremendous amount of human and material resources were spent to control or contain these fires. Furthermore,

emissions from the fires burning in upwind states were not reasonably controllable or preventable.

3 In Excess of Historical Fluctuations

3.1 Pinehurst Historical Fluctuations

In Figure 22, the $PM_{2.5}$ concentrations measured at Pinehurst during July through September are shown for 2004 through 2012. The data show that most values remain below $10 \mu\text{g}/\text{m}^3$ during the fire season, with periodic excursions up to $20\text{--}25 \mu\text{g}/\text{m}^3$. Idaho experiences wildfire impacts every summer. Some seasons are worse than others. According to EPA guidance (EPA 2013b), “The EPA acknowledges that natural events can occur and still be eligible for exclusion under the EER; therefore, events do not necessarily have to be rare to satisfy this element.” Wildfire impacts are recurring, natural, and not reasonably controllable or preventable phenomena as shown by the historical fluctuations presented in Figure 22.

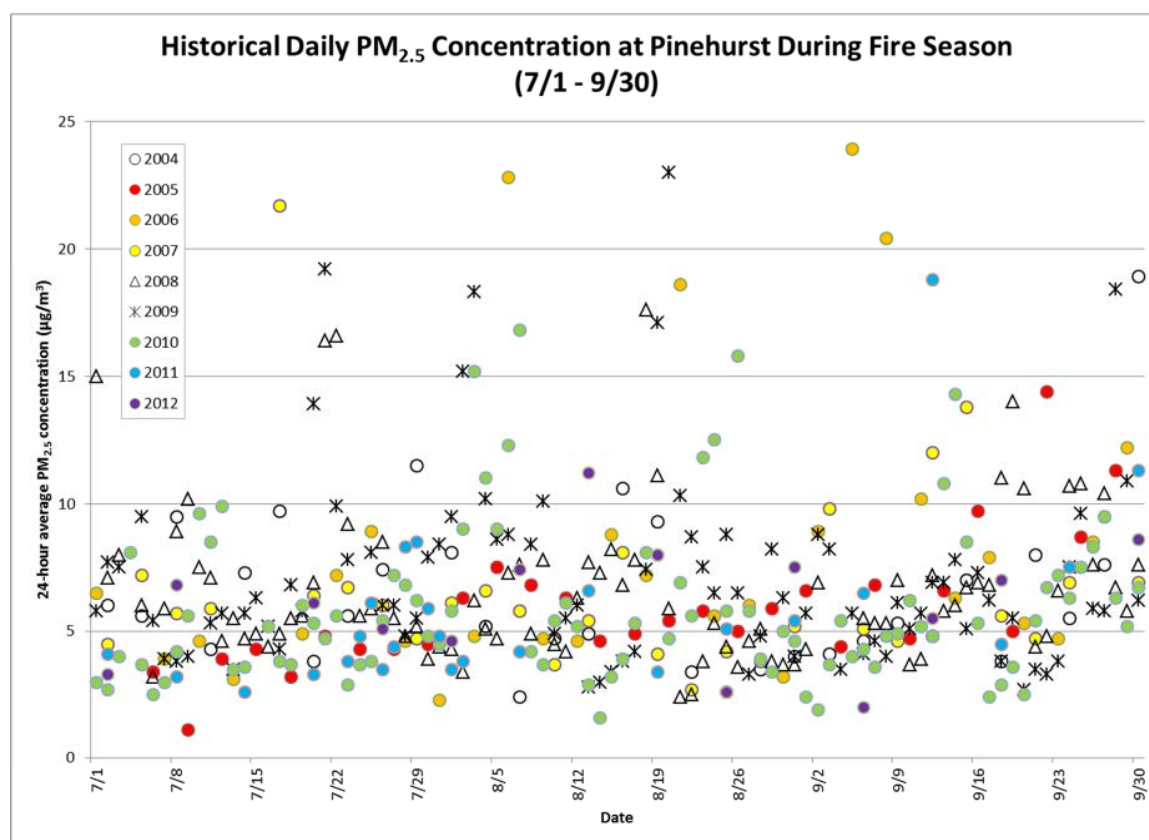


Figure 22. $PM_{2.5}$ historical fluctuations in Pinehurst, Idaho, 2004–2012.

Table 2 shows the statistics for $PM_{2.5}$ concentrations measured during the fire period from 2004 to 2012 and separately for 2013. All statistics except for standard deviation and maximum are slightly higher for the 2013 season, as compared to the historical seasons, but, in general, the values are quite close and reflect the recurring nature of wildfires in Idaho.

Table 2. Statistics for 24-hour PM_{2.5} concentrations recorded in Pinehurst during the wildfire season, 2004–2012 and 2013.

Statistic	2004–2012	2013
Mean	6.7	7.1
Median	5.7	6.8
Mode	3.8	6.7
Standard deviation	3.8	2.6
Minimum	1.1	2.0
Maximum	23.9	22.6

Table 3 shows the average PM_{2.5} concentration and the 95th and 99th percentile of concentrations monitored in Pinehurst during the 2004–2012 fire periods. The range of normal historical fluctuations above the mean is represented by the range from the average value to the 95th percentile value, in this case, 6.7 to 15.1 $\mu\text{g}/\text{m}^3$. These values are compared to the 24-hour average concentrations for the days requested for concurrence; an event contribution is calculated for each day. The difference between the 24-hour average and the range of normal historical fluctuations (average to 95th percentile) are values suggestive of the level of impact of the event (Appendix B).

Table 3. Average and 95th and 99th percentile concentrations of PM_{2.5} during the 2004–2012 wildfire periods.

Average ($\mu\text{g}/\text{m}^3$)	95th percentile	99th percentile
6.7	15.1	22.2

Table 4 shows the percentile ranking for the PM_{2.5} concentrations at the Pinehurst monitor for the days included in this request. All days requested are higher than the 93rd percentile relative to the fire season average for 2004–2012.

Table 4. Percentile ranking for the monitor values requested in this demonstration, relative to unaffected days in the same period from 2004–2012.

Date	PM _{2.5}	Percentile (7/1–9/30)
7/1	26.8	100%
7/2	22.6	99%
7/25	12	93%
7/26	12.2	93%
7/29	13.6	94%
7/30	17	97%
7/31	16.8	96%
8/1	12.5	93%
8/7	13.3	94%
8/8	14.5	95%
8/9	13.7	94%
8/10	15.2	95%
8/11	18.1	97%
8/12	16.4	96%
8/13	13.1	94%
8/15	13.6	94%
8/16	13.3	94%
8/24	16.4	96%
8/25	12.9	94%
9/2	12.2	93%
9/3	12.7	93%
9/4	16.2	96%
9/5	13.4	94%
9/14	14.4	95%

Figure 23 shows the PM_{2.5} concentrations during the 2013 fire period compared to concentrations in the same period, 2004–2012. The dashed lines indicate the average value and 95th percentile of the normal years during the same period. There were a total of 8 days in which the PM_{2.5} concentrations were greater than the 95th percentile. The difference between the 24-hour average and the range of normal historical fluctuations (average to 95th percentile) are values suggestive of the level of impact of the event.

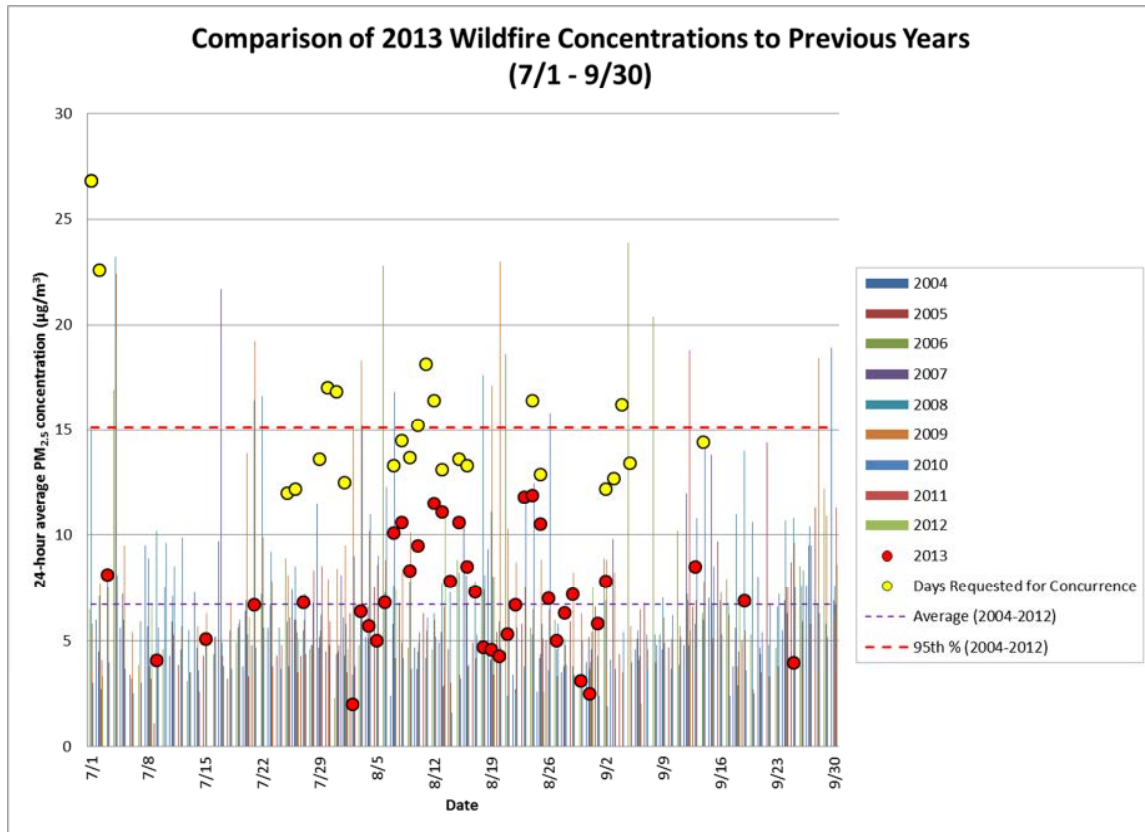


Figure 23. PM_{2.5} concentrations during the 2013 wildfires compared to previous years.

4 Clear Causal Relationship

Showing a clear causal relationship between a source and monitor is generally a weight of evidence demonstration involving several elements. These elements are covered in detail for two scenarios that DEQ found to recur periodically throughout the wildfire season. In Appendix B, the evidence for each day refers to the scenario or scenarios likely to have contributed on that day. In addition, DEQ provides a concise description of how the evidence for that day demonstrates the clear causal relationship, along with a summary of each EER element for that day.

4.1 Similarity of Chemical Composition of Measured Pollution with that Expected from Sources Identified as Upwind

Wildfire smoke consists largely of organic carbon (OC) mass and elemental carbon (EC) mass. Since organic carbon can also be formed from biogenic VOCs by photochemical production of secondary organic aerosol (SOA), OC is not a good indicator for wildfires. EC is only produced by direct emissions from combustion sources, and since rural and remote areas experience very low anthropogenic EC contributions, EC can be a good indicator for non-anthropogenic EC, i.e. primarily wildfires. Chemical speciation data are not available from Pinehurst during the 2013 wildfire monitoring days included in this request. However, the Interagency Monitoring of PROtected Visual Environment (IMPROVE) aerosol speciation data collected in wilderness areas (Colorado State University 2015) provides information on the atmospheric elemental carbon aerosol levels across the region. Figure 24 shows the IMPROVE sites where $PM_{2.5}$ was increased while Figure 25 shows the regional pattern of the Quarter 3 to Quarter 2 (Q3/Q2) ratios of elemental carbon/ $PM_{2.5}$ fractions (EC/ $PM_{2.5}$). The $PM_{2.5}$ increases are significant primarily in Idaho, while the Q3/Q2 ratios of EC fractions are a more sensitive indicator of wildfire influence and appear to influence an even wider area.

The Q2 period (March – June) is always largely free of wildfires but includes all normal, day-to-day anthropogenic sources of elemental carbon, while Q3 (July – September) includes the normal sources as well, plus biomass burning in Q3 that exceeds the biomass burning contribution in Q2. In low wildfire years, represented by the blue bars with 95% confidence level “error bars”, Q3 also includes the same normal anthropogenic sources including crop residue burning (CRB) and prescribed burning (Rx), so in the absence of wildfires, the average Q3/Q2 ratio is consistently around 1.0 in the most remote locations (SULA1, HECA1). In areas closer to regional CRB/Rx burning, the Q3/Q2 ratios average around 1.10 (see inset bar chart in Figure 25). In 2013, the Q3/Q2 ratio is significantly greater than the average for the “low wildfire years”, demonstrating that the available chemical composition data are consistent with wildfires burning across the region. These remote wilderness sites experience very little urban traffic and industrial impacts, and since the “low wildfire years” averages already account for normal CRB/Rx burning, regionally widespread wildfires can be the only reasonable explanation for the significantly increased Q3/Q2 ratios of EC fractions in 2013.

On a daily basis, the satellite images shown in this section and Appendix B leave no doubt where the high concentrations of $PM_{2.5}$ originated for each flagged day. DEQ believes the regional pattern of high elemental carbon in Quarter 3 relative to Quarter 2, as shown in Figure 25,

demonstrates that the elevated Q3 PM_{2.5} concentrations from July through September 2013 have a composition high in elemental carbon, consistent with wildfire smoke and unexplainable by normal anthropogenic sources, including CRB and Rx.

4.2 Occurrence and Geographic Extent of the Event

Wildfires impacting the Pinehurst airshed during the 2013 wildfire season are shown in Figure 2. The major fires were numerous and well distributed around the northwest. The increased fine particulate matter, in terms of PM_{2.5} (or RCFM, Re-Constructed Fine Mass) resulting from these fires was significantly increased in Idaho, as shown in Figure 24 and the elemental carbon that serves as a wildfire tracer was also observed to be significantly enhanced throughout the region, as shown in Figure 25. These two figures define the geographic extent of the 2013 wildfire event in the Pinehurst region. The extent of the event each day was often very complex due to the large number of source fires; however, MODIS satellite images are available (Appendix B) to show the extent of smoke occurrence each day, at least during the morning Terra satellite pass (approximately 10:45 a.m. local time) and afternoon Aqua satellite pass (approximately 13:45 p.m. local time).

The broad regional patterns of enhanced PM_{2.5} (Figure 24) and of the Q3/Q2 EC fractions (Figure 25), along with the emissions comparison in Figure 3, demonstrates that typical crop residue burning, prescribed burning, industrial point sources, and nonpoint sources, including residential wood combustion, and all other forms of open burning, which are all accounted for in the “low wildfire years” bars are small compared to the 2013 wildfire emissions and are not capable of producing such a region-wide increase in the level of PM_{2.5} and of EC. This is further supported by the fact that Q3/Q2 ratios are close to 1.0 in low wildfire years when normal anthropogenic source activity is present. We conclude that the statistically significant, region-wide increase in elemental carbon during July – September 2013 parallels the increase in PM_{2.5} at Idaho IMPROVE sites, and since CRB and Rx are already accounted for in the “low wildfire years” the significant increases above those years can only be explained by the wildfires.

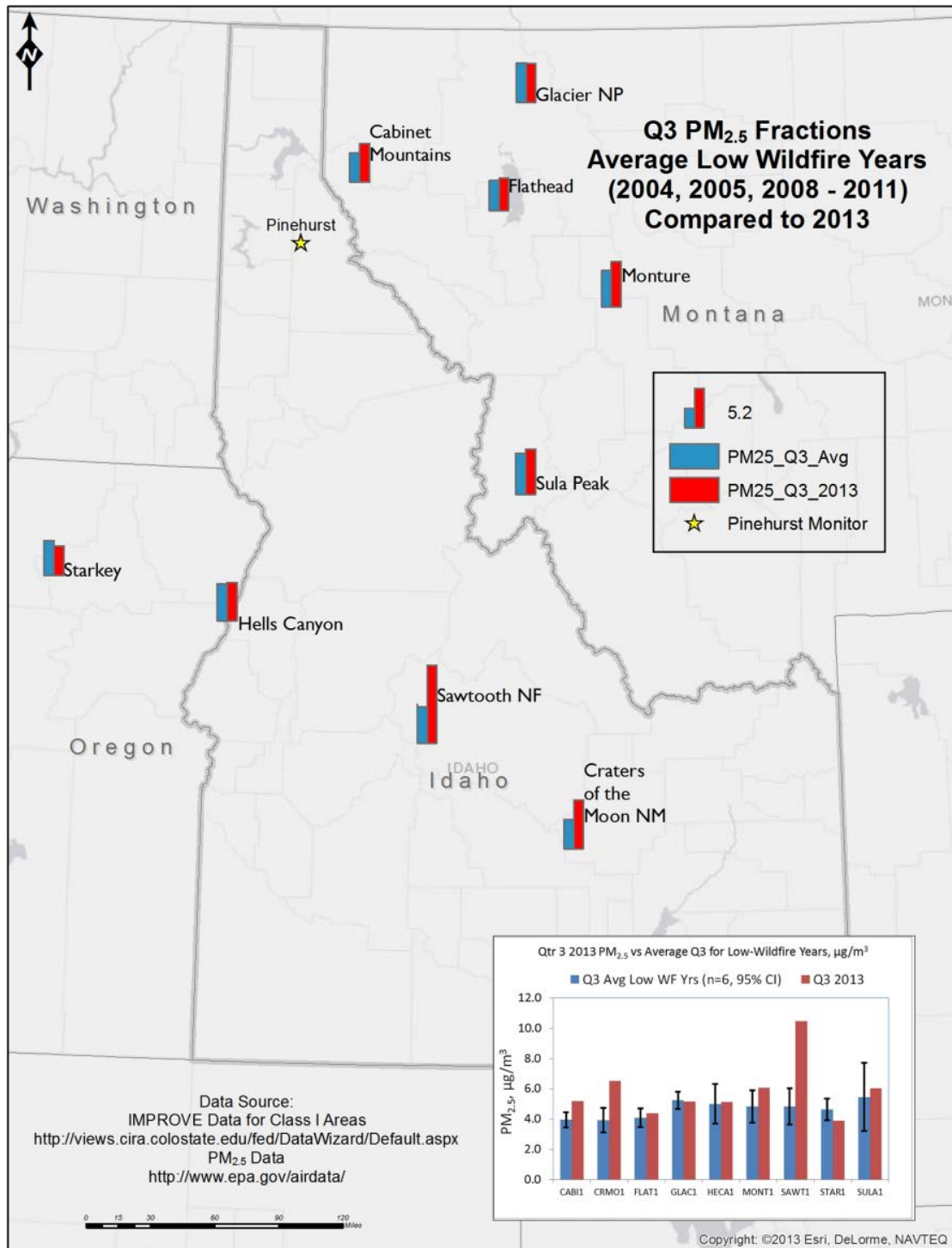


Figure 24. PM_{2.5} ratios of Quarter 3 average for low-wildfire years compared to Q3 2013, for IMPROVE sites in the Pinehurst region. Error bars represent 95% confidence level.

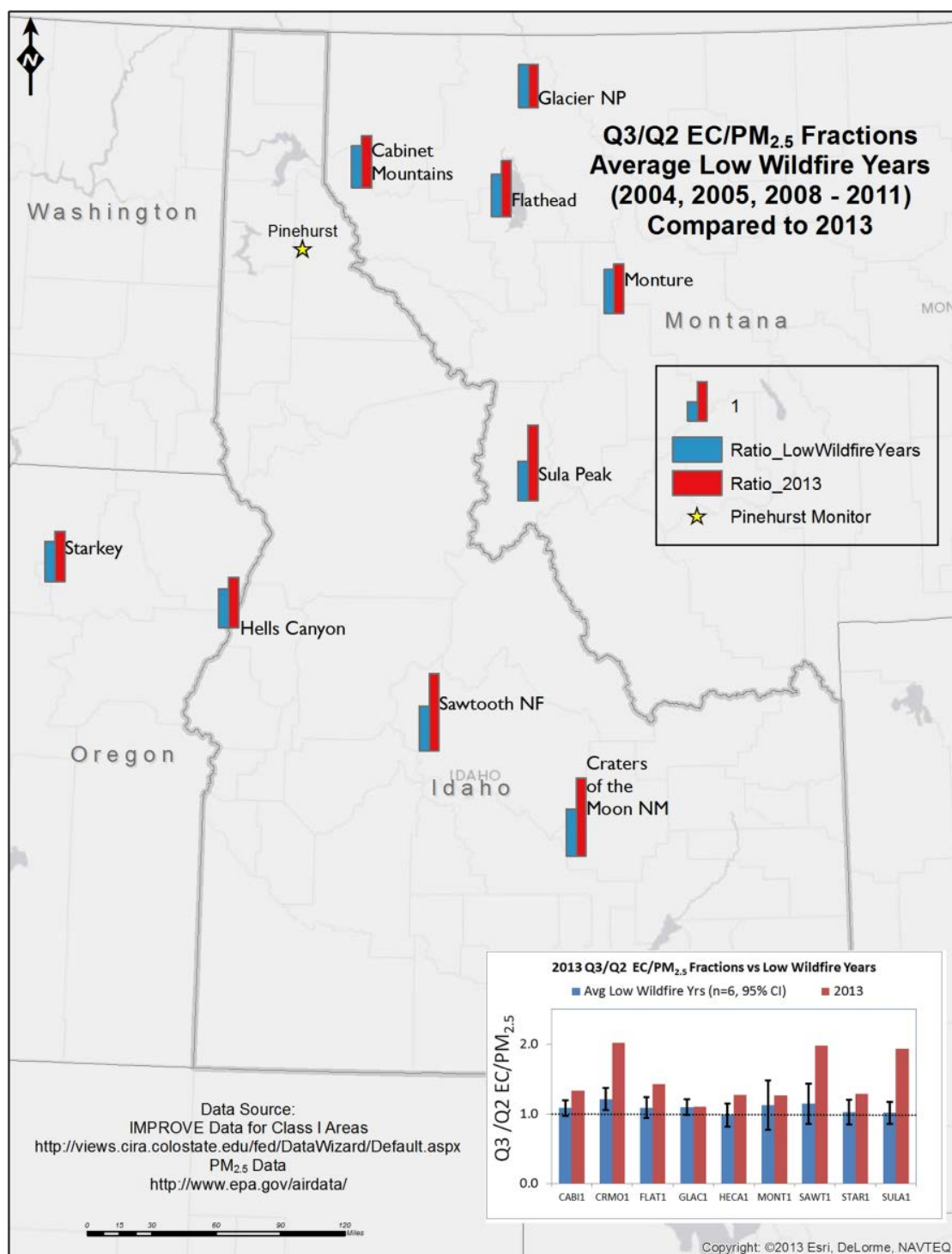


Figure 25. Ratios of Quarter 3 to Quarter 2 (Q3/Q2) elemental carbon to PM_{2.5} fractions for 2013 compared to the average ratios for six low-wildfire years, for IMPROVE sites in the Pinehurst region. Q2 is the Spring, largely without fires, and Q3 the fire season. Error bars represent 95% confidence level.

4.3 Alternative Source Hypotheses

One important element of the clear causal relationship demonstration is to explore alternate hypotheses for potential sources. The discussion of composition and geographic extent in section 4.1 makes it clear that the high PM_{2.5} concentrations resulted from a source of biomass combustion due to the widespread, elevated organic carbon levels. While wildfires clearly caused most or virtually all the smoke, it is important to discuss potential alternative source hypotheses. In this section, the other sources of organic carbon are discussed with a scenario showing the clear causal relationship. Appendix B provides tables for each day that demonstrate the clear causal relationship.

The potential alternative sources described in this section include the normally expected anthropogenic sources of smoke. These sources are small on a statewide basis compared to the 2013 wildfire emissions (Figure 3). In addition, these routine PM_{2.5} sources occur at more or less similar levels from year to year and are therefore included in the historical monitor values. The average and 95th percentile PM_{2.5} values from this wildfire season already incorporate the contributions from anthropogenic sources, and any concentration above 15.1 µg/m³ at the Pinehurst monitor probably cannot be significantly attributed to any of these potential alternative sources.

4.3.1 Prescribed Fires

The magnitude of elevated smoke-related PM_{2.5} concentrations suggests that only major wildfires can generate so much smoke or significantly contribute to such levels across an entire region. The emissions comparison in Figure 3 suggests that prescribed burning is very small in comparison to the 2013 wildfires in terms of PM_{2.5} emissions. Prescribed burning in Idaho is regulated under IDAPA 58.01.01.614. All federal and state prescribed burners, as well as most large private prescribed burners, are members of the Montana/Idaho Airshed Group (<http://www.smokemu.org/>). The airshed group members follow an operating guide based on basic smoke management techniques. Eight prescribed burns occurred during the wildfire season, July 1 through September 14 (Table C-5).

4.3.2 Crop Residue Burning

Crop residue burning was restricted in the burn management areas near active wildfires. The burn decision summaries for August through September are provided in 0. The summaries show that crop residue burning was restricted in the counties near Pinehurst on most days requested for concurrence. On the days when crop residue burning was allowed, August 7, 9, 13, and September 4, the field burns may have contributed to the elevated concentrations at the Pinehurst monitor. Shoshone and Lemhi Counties are not listed on the burn decision summaries because these are largely mountainous counties, and no burns were approved in those counties for September through October. In addition, the estimated crop residue burning emissions are typically around 850 tons per year or approximately 5 tons per day—over 88 times lower than the 2013 wildfire emissions on a daily basis, as shown in Figure 3.

4.3.3 Residential Wood Combustion

Pinehurst is subject to the influence of residential wood combustion in the cold seasons. Residential wood combustion typically does not commence until the evening temperatures dip below about 40°F, typically in October. Temperatures are shown in the hourly time series chart for each day included in Appendix B so it can be verified that none of the days included in this request dropped below these temperatures in the evening; therefore, no significant residential wood combustion is likely to have contributed any significant emissions to any of these events. The latest monitor value included in this request was observed on September 14, 2013.

4.3.4 Other Forms of Open Burning

All open burning in Idaho, outside the five Indian reservation boundaries, is regulated by DEQ under the “Rules for Control of Open Burning” (IDAPA 58.01.01.600). Open burning is included in the nonpoint source category in the 2011 NEI emissions for Idaho (along with many other sources), and Figure 3 shows that no sources in that category come close to the average daily emission rate for wildfires that was estimated for the 2013 wildfire season.

4.3.5 On-road Mobile Sources

On-road mobile sources can often be a significant source category in large cities but primarily for exhaust gases. Road dust and some exhaust emissions contain PM_{2.5}; however, as shown in Figure 3, on-road mobile particulate emissions are extremely low compared to wildfires in 2013. It is not likely that on-road mobile emissions contributed any significant PM_{2.5} in Pinehurst to the PM_{2.5} concentrations observed during the wildfire season.

4.4 Scenarios

Transport scenarios were developed from data analysis and observation as a way to group the daily events and to formulate the conceptual models described in section 1. The Pinehurst scenarios were developed to delineate the days when long-range transport, as opposed to local stagnation, were the main drivers of smoke transport to the monitor. The scenarios are described in detail below with examples. In Appendix B, each day is assigned one or more scenarios to describe DEQ’s best judgment of the contributing transport conditions. It should be noted that on some days, both scenarios may contribute. Some uncertainty in the contributing transport paths for all parts of the day is not an indication that smoke did not impact the monitor. Refer to this section when reviewing the scenarios identified in Appendix B.

In the following examples, satellite images are all MODIS satellite products (NASA 2015). Back trajectories superimposed on the MODIS images are produced using the Ready HYSPLIT model (Draxler and Rolph 2003) and the NAM 12 km meteorological dataset. Time series charts are based on DEQ’s PM_{2.5} monitoring data obtained from AirData (EPA 2015), and DEQ meteorological monitoring.

4.5 Pinehurst Scenario 1: Regional Transport

Scenario 1 describes the conditions that occur when long-range smoke advects to the monitor in Pinehurst. During the 2013 fire season, there were no large fires burning near Pinehurst;

however, many large fires burned to the south of Pinehurst in Idaho, and to the west and southwest in Washington, Oregon, and California. Fires were also burning to the north in Canada. Smoke from these fires affected the air quality in Pinehurst. This scenario is summarized below:

- Smoke from regional fires advects into Pinehurst.
- Fire sources can be within Idaho or from neighboring states.
- Characterized by sustained, elevated concentrations on the hourly trace.
- Satellite imagery shows multiple fires in the region.
- Back trajectories intersect visible smoke in MODIS images, HMS Analyzed Smoke polygons, and/or HMS fire detects.

4.5.1 Description of Typical Weather Conditions and Transport Winds

September 3, 2013, was selected as an example for Scenario 1 (Figure 26 and Figure 27). In this example, a blocking pattern typical to the interior western United States is established. The semipermanent, seasonally driven Four Corners high-pressure system produces a ridge that extends from Mexico to Canada with a ridge axis situated along the Continental Divide. Offshore, an upper-level low-pressure system intensifies and becomes cut off from the jet stream, which is now deflected north into Canada. This low-pressure system drops south and remains relatively stationary during this event. At the surface, pressure gradients are incredibly weak with a 0.6 mb pressure gradient from Boise to San Francisco (a rate of change of approximately 0.1 mb/100 miles). This translates to both weak surface winds and weak transport winds aloft that allow stagnant conditions to develop and local thermodynamically driven slope flows to become the primary wind force. Regional smoke transport plays a much larger role outside of regions locally close to active fires.

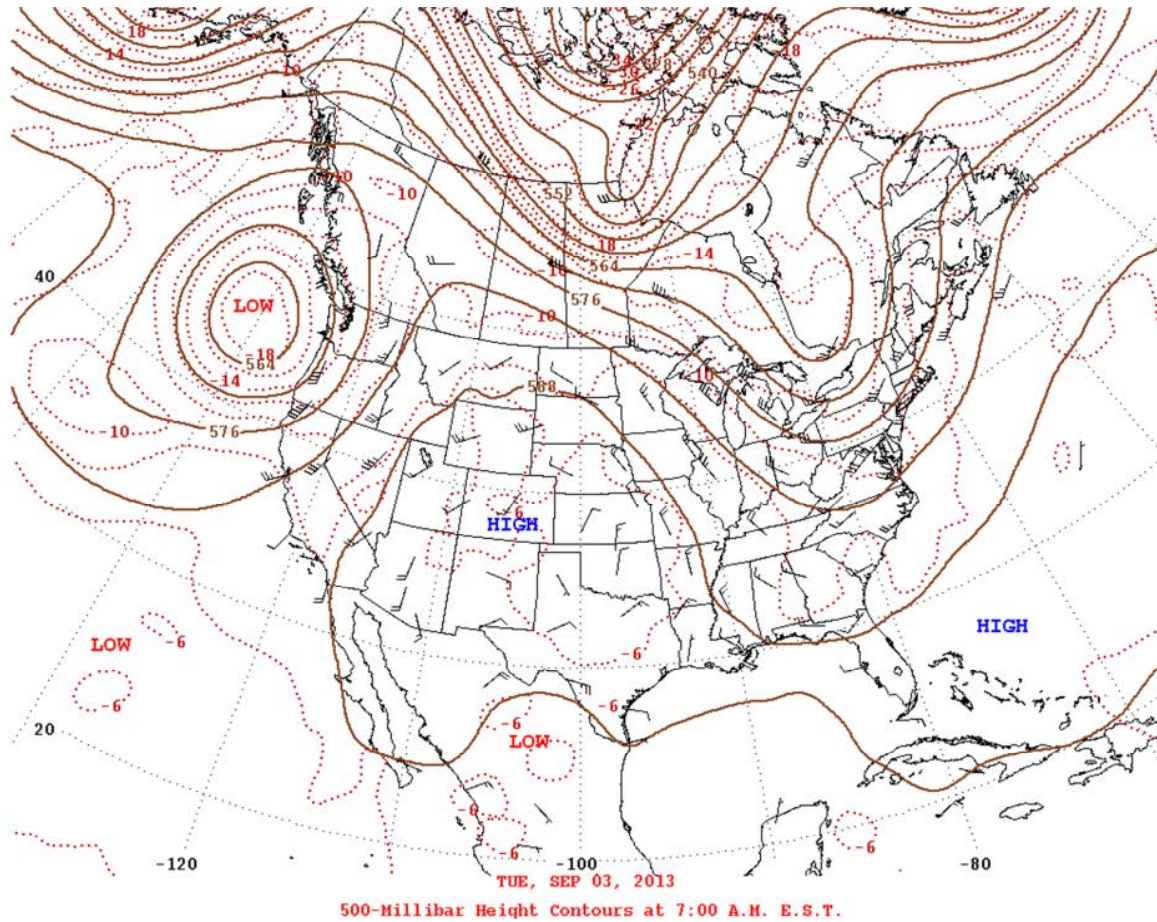


Figure 26. The 500 mb height contours and wind barbs at 0500 MST, September 3, 2013 (NOAA 2015).

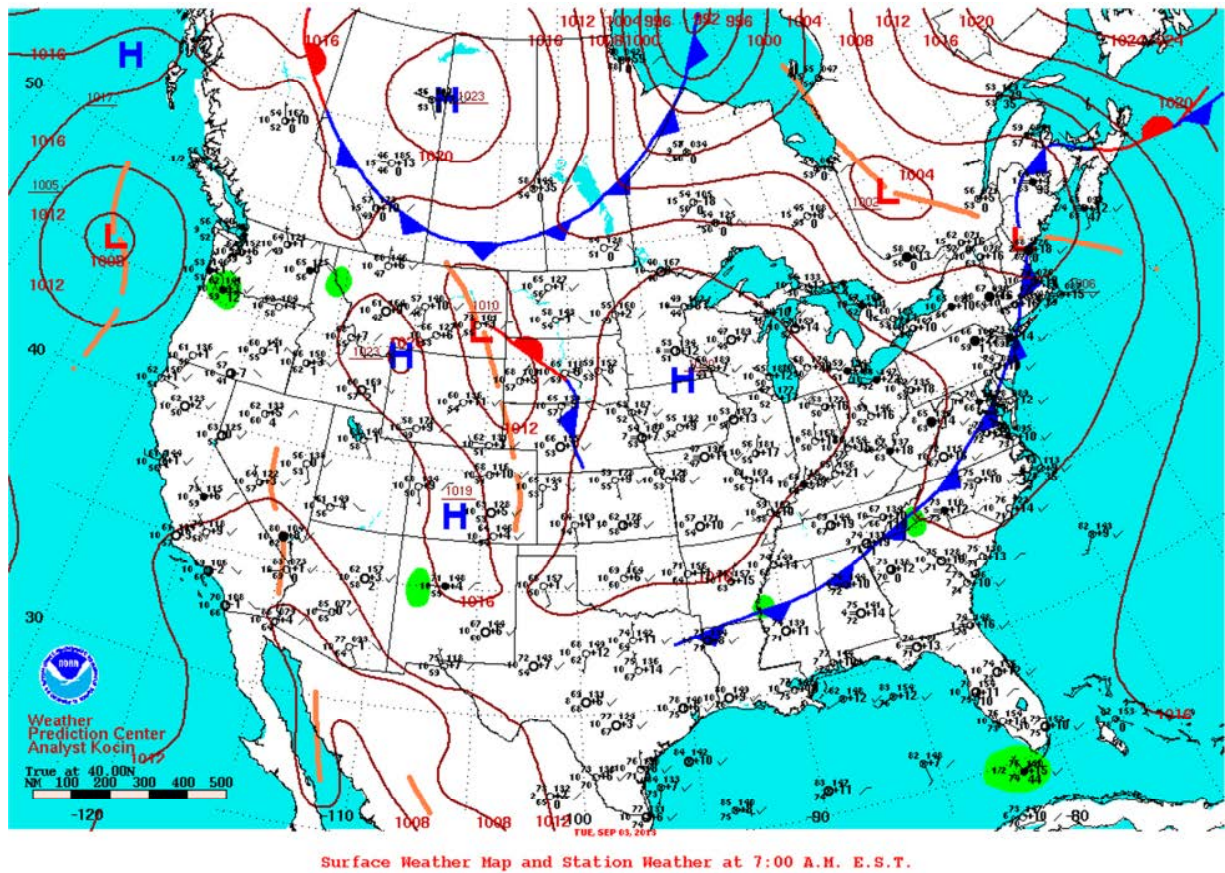


Figure 27. Surface weather analysis and station weather at 0500 MST, September 3, 2013 (NOAA 2015).

4.5.2 Transport of Typical Emissions and Spatial Relationship between Sources and Monitor

In Figure 28, the afternoon satellite image shows a large plume from the Rim fire in Yosemite tracking across western Nevada and into southeastern Oregon. The smoke is visible in the MODIS imagery and has also been delineated in the HMS Analyzed Smoke product. The 24-hour back trajectories originating in Pinehurst show air parcels at 500 and 1,000 meters above ground level intersecting the Rim fire smoke plume and advecting the smoke directly into Pinehurst. HMS fire detects identify the source of the smoke in California.

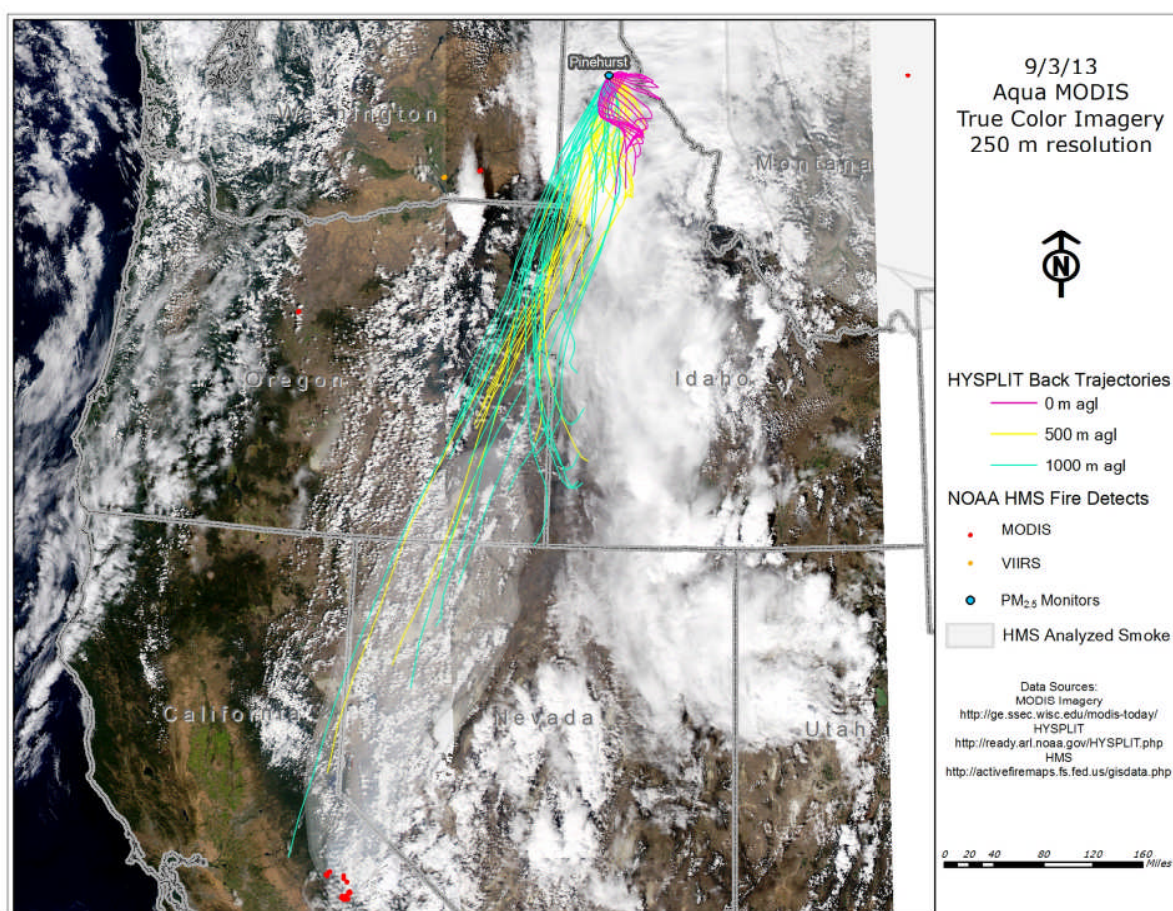


Figure 28. Aqua MODIS satellite image shows HYSPLIT model back trajectories intersecting visible smoke and HMS Analyzed Smoke polygons from the Rim fire in California.

4.5.3 Typical Temporal Relationship between Wildfires and Elevated PM Concentrations at Monitor

The evidence from the hourly PM_{2.5} trace indicates relatively steady elevated levels throughout the day, which supports the southwest-northeast aligned trajectories that cover 24 hours of steady advection. Six hourly PM_{2.5} values are above the 95th percentile (Figure 29).

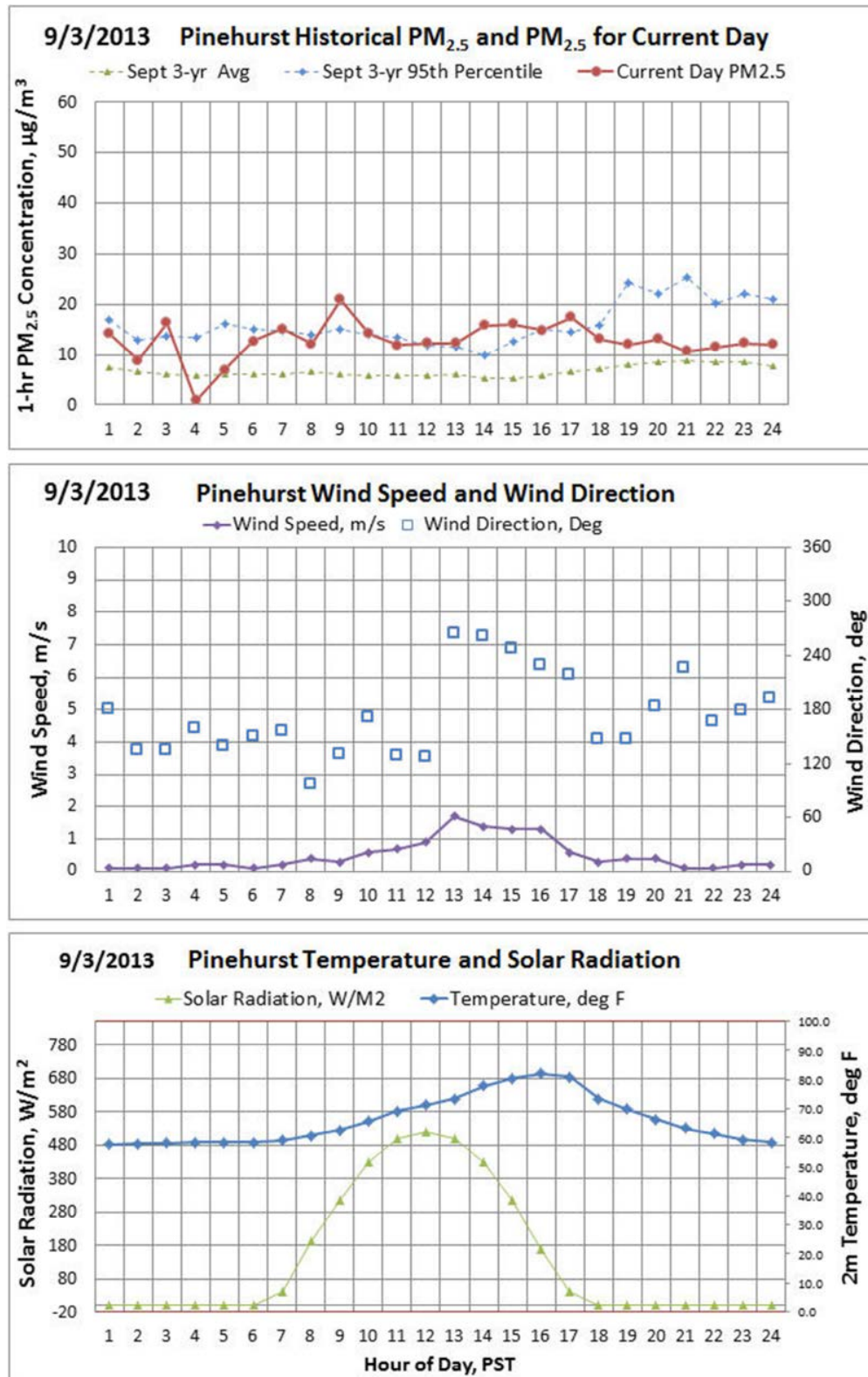


Figure 29. Time series charts for September 3, 2013, showing 2013 PM_{2.5} concentrations versus historical (2010–2012) average and 95th percentile values for September days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation (bottom chart).

4.5.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 29, top chart, the PM_{2.5} time series chart for each day includes the typical nonevent daily pattern for that day in 2012, 2011, and 2010 in terms of the monthly average for each hour, and the monthly 95th percentile value. The hourly PM_{2.5} concentrations in Figure 29 exceed the hourly 95th percentile value for 6 hours and are above the historical monthly average for all but 1 hour.

4.5.5 Alternative Source Hypothesis

Residential wood combustion does not occur to any great extent during September but typically begins in October. The daytime Pinehurst temperature on September 3 ranged from the upper 50s overnight to over 80°F in the afternoon. Residential wood combustion does not typically begin until the daytime or evening temperatures are below 35°F–40°F. In addition, crop residue burning did not occur in Idaho because of poor ventilation (0), and prescribed burning did not occur (0). No other source of smoke or PM_{2.5} was large enough to cause the levels exceeding the 95th percentile values for part of the day as observed in Pinehurst on September 3, 2013. We conclude that the elevated levels are the result of the large plume issuing from the Rim fire and advecting to the Pinehurst monitor.

4.6 Scenario 2: Local Stagnation

Scenario 2 describes the conditions that occur when smoke advected to Pinehurst from wildfires remains trapped in the valley due to stagnant atmospheric conditions. Pinehurst's location in a small valley less than 2 kilometers (km) in diameter, and surrounded by mountains, causes smoke to become trapped in local nocturnal inversions, which sometimes do not break for several days at a time due to the strength of the cold air pool. This scenario is summarized below:

- Smoke from regional fires advects into Pinehurst and is trapped in the small valley.
- Atmospheric conditions are stable.
- Pinehurst is too small to detect visible smoke from satellite imagery, but regional clues to stagnation include smoke trapped in river valleys.
- Back trajectories do not travel far during 24-hour period, suggesting low wind speeds.

4.6.1 Description of Typical Weather Conditions and Transport Winds

July 31, 2013, was selected to represent the second Pinehurst scenario of local stagnation (Figure 30 and Figure 31). The 500 mb chart indicates a pattern similar to the one analyzed previously with an established Rex block pattern over western British Columbia, which serves to further limit horizontal motion of air around Idaho. Again, the semipermanent Four Corners high is well-established and forcing a ridge through Idaho and into Canada. At the surface, the pressure gradient force is slightly stronger, but a thermal trough can be identified in the lee of the Cascades and typically provides conditions that promote subsidence and sinking air. These conditions promote stagnant conditions in northern Idaho.

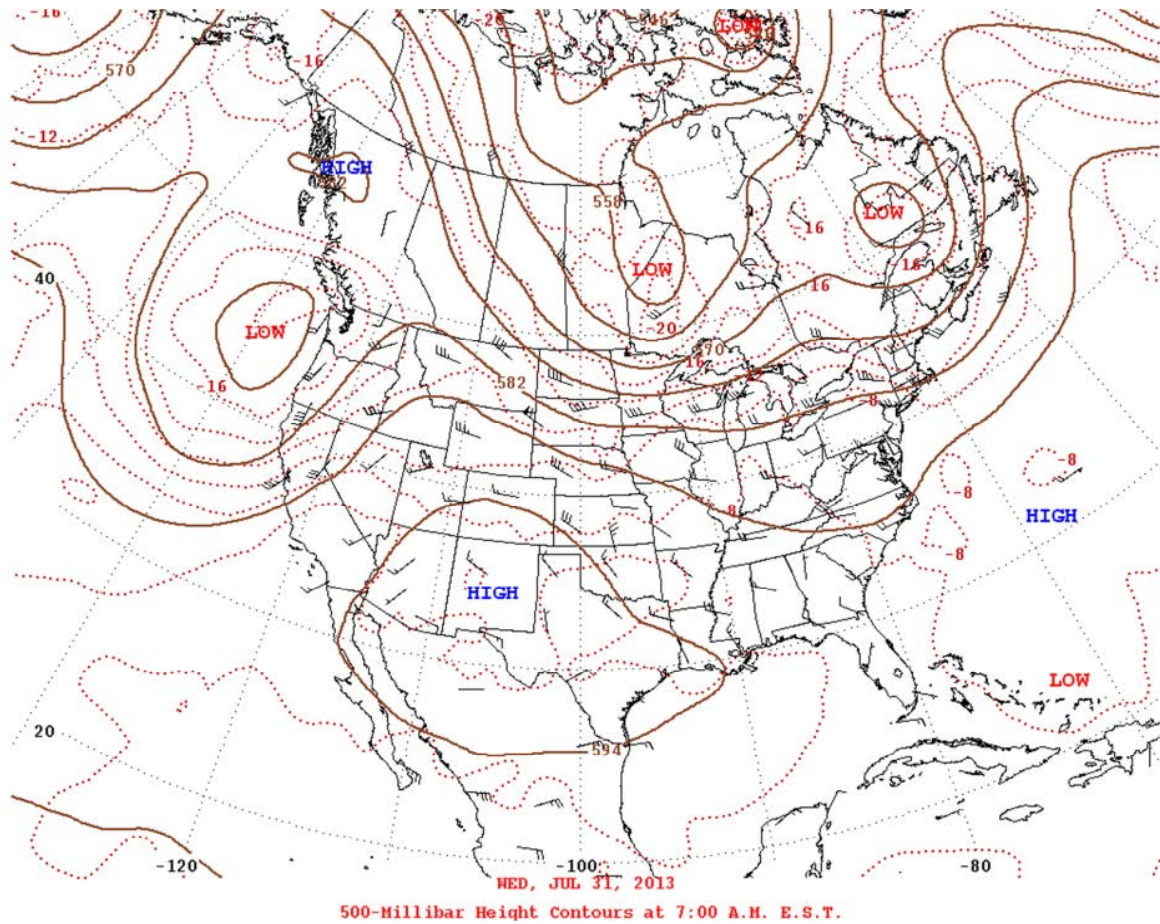


Figure 30. The 500 mb height contours and wind barbs at 0500 MST, July 31, 2013 (NOAA 2015).

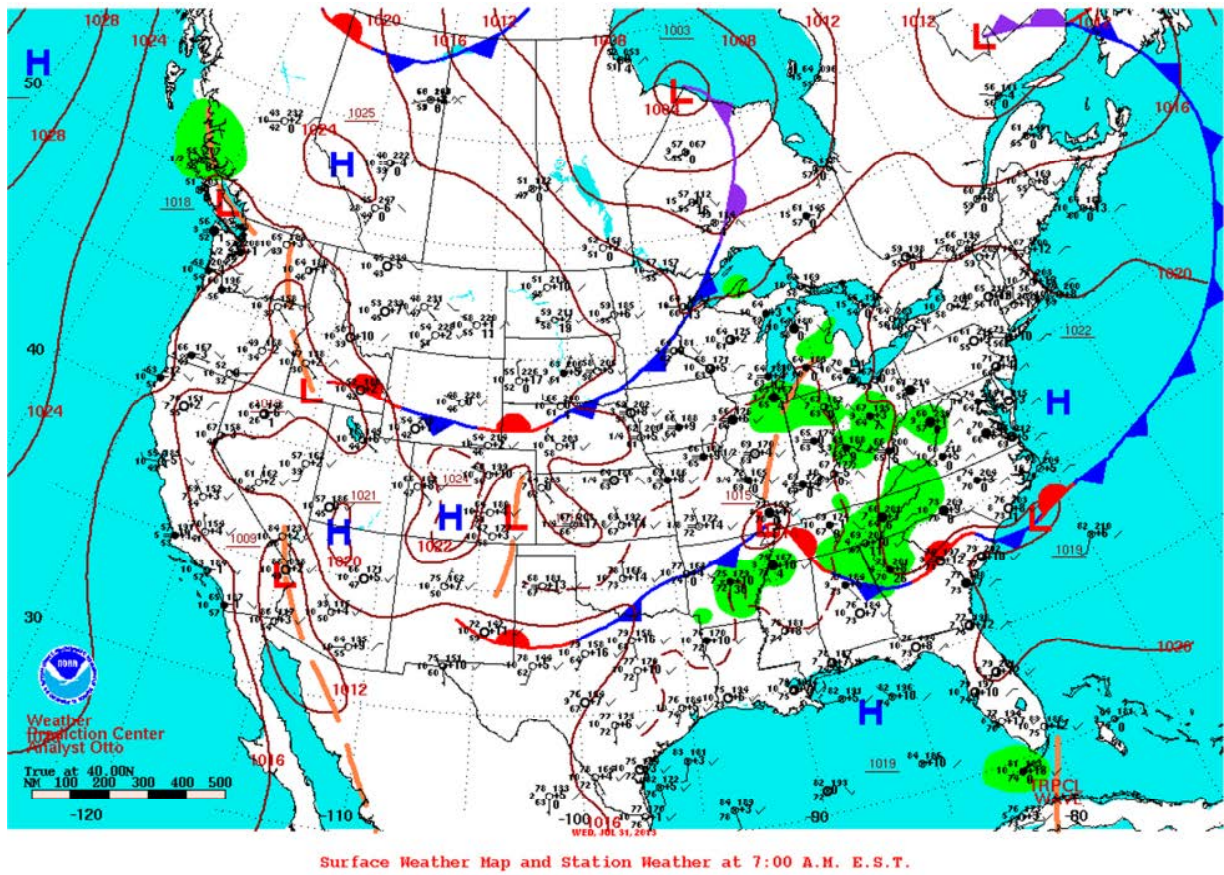


Figure 31. Surface weather analysis and station weather at 0500 MST, July 31, 2013 ((NOAA 2015).

4.6.2 Transport of Typical Emissions and Spatial Relationship between Sources and Monitor

In Figure 32, the morning satellite image shows light smoke throughout northern Idaho, eastern Washington, and western Montana. Back trajectories do not travel far during the 24-hour period, adding evidence of the low wind speeds and the generally stagnant conditions. The confused direction of the trajectories indicate the primary role that thermally driven terrain wind flows take as the wind direction pattern follows that of a typical diurnal pattern commonly seen in complex terrain and mountain-valley interfaces.

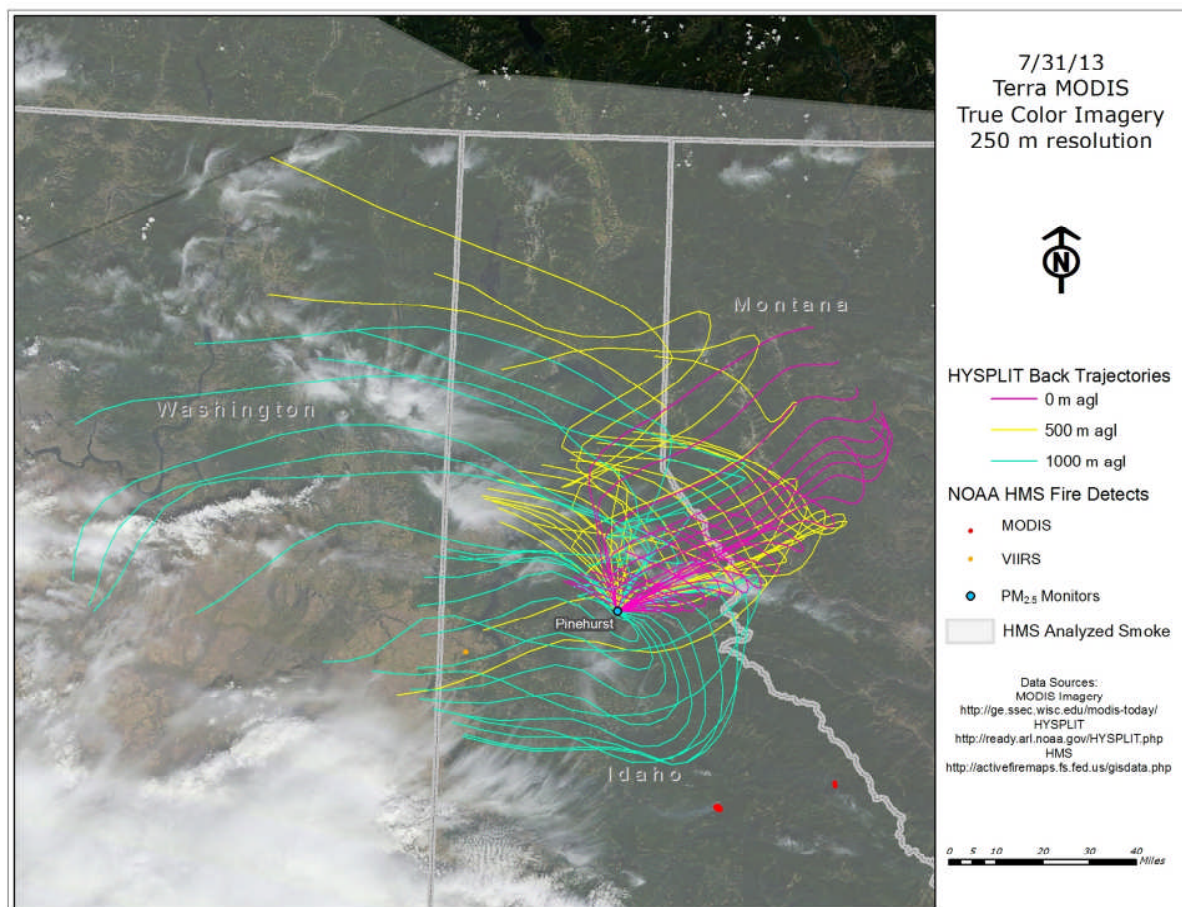


Figure 32. Terra MODIS satellite image showing fire detects and light smoke blanketing northern Idaho. HYSPLIT model back trajectories are short indicating stagnant air.

4.6.3 Typical Temporal Relationship between Wildfires and Elevated PM Concentrations at Monitor

The hourly PM_{2.5} trace (Figure 33) shows generally elevated and sustained concentrations above the hourly 95th percentile levels throughout the day. Existing smoke in the airshed is trapped and weak winds do not bring fresh smoke, indicating local stagnation.

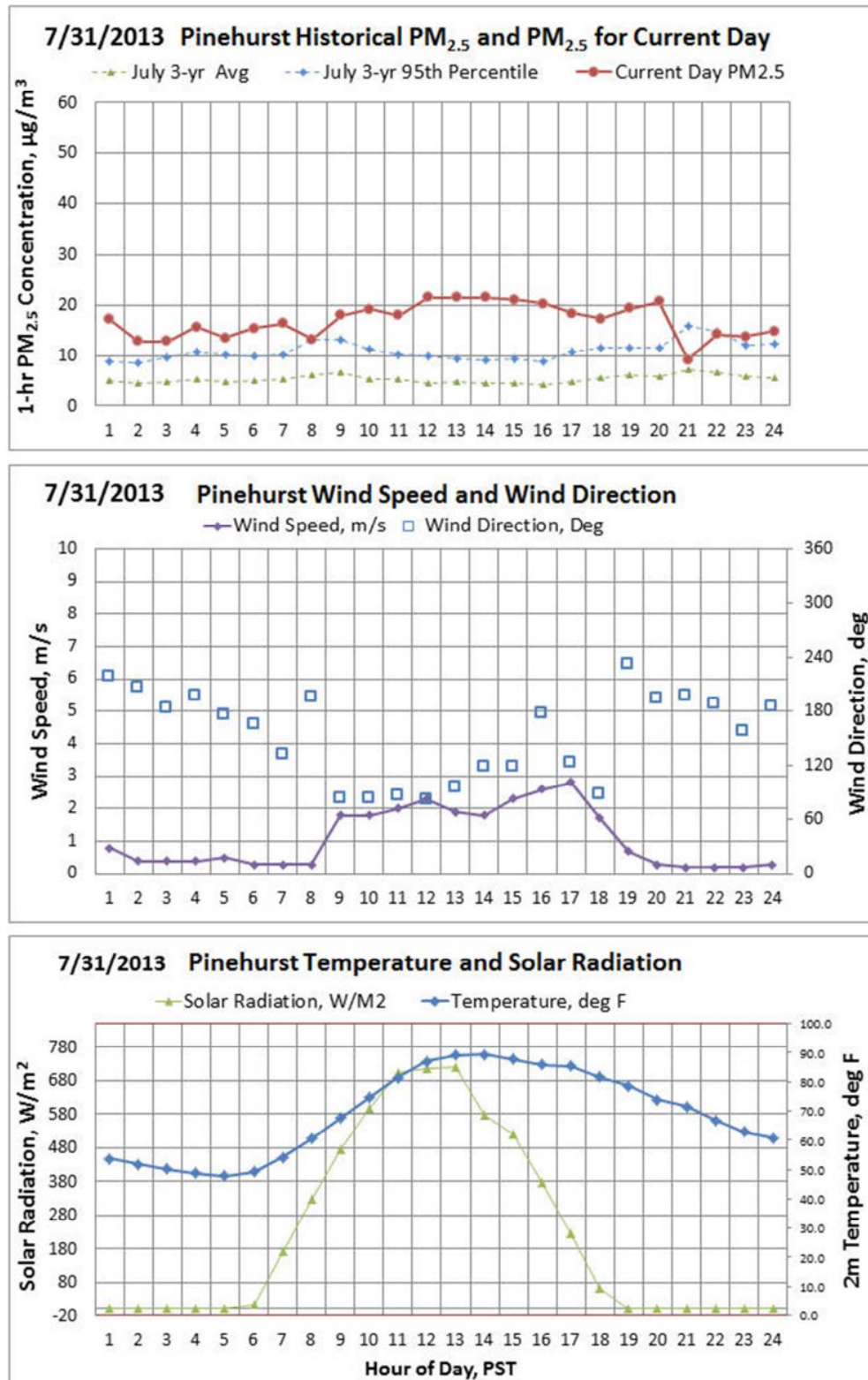


Figure 33. Time series charts for July 31, 2013, showing 2013 PM_{2.5} concentrations versus historical (2010–2012) average and 95th percentile values for July days (top chart); wind speed and wind direction (middle chart); and temperature and solar radiation (bottom chart).

4.6.4 Comparison of Event-Affected Days to Specific Nonevent Days

As shown in Figure 33, top chart, the PM_{2.5} time series chart for each day includes the typical nonevent daily pattern for that day in 2012, 2011, and 2010 in terms of the monthly average for each hour, and the monthly 95th percentile value. The hourly PM_{2.5} concentrations exceed the hourly 95th percentile values for all but 2 hours.

4.6.5 Alternative Source Hypothesis

Residential wood combustion does not occur in July or in most of the wildfire season but typically begins in October. The daytime temperature on July 31 ranged from the low 50s overnight to over 90°F during the day. Residential wood combustion does not typically begin until the daytime or evening temperatures are below 35°F–40°F. Prescribed burning did not occur (0). No other source of smoke or PM_{2.5} is large enough to cause the levels exceeding the 95th percentile values as observed in Pinehurst on July 31, 2013. The day-long elevated levels reflect the smoke that filled the valley and remained trapped by stagnant conditions throughout the day.

5 Affects Air Quality

EER requires agencies document that the identified source of an exceptional event truly affected air quality at the location of the monitor in question. EPA's interim high wind guidance (EPA 2013c) indicates that if historical fluctuations (section 3) and a clear causal relationship (section 4) have been adequately demonstrated, then the affects air quality element will have been met. DEQ believes that the historical fluctuations and clear causal relationship evidence has been fully demonstrated and is very strong; therefore, the affects air quality requirement is met.

6 Natural Event or Human Activity Unlikely to Recur

The EER requires agencies document whether the identified source of an exceptional event is a natural event or a human activity unlikely to recur at the same location and affect the monitor in question again. EPA's interim high wind guidance (EPA 2013c) indicates that if an agency has adequately demonstrated that the source is a *natural event* or, if not natural, is a human activity unlikely to recur at the same location and that there is a *clear causal relationship* between the identified sources and the affected monitor, then the human activity unlikely to recur or a natural event criterion is also satisfied.

The primary fires affecting Pinehurst as well as the majority of the other fires in the region were caused by lightning and are of natural origin. The few human-caused fires in the region are unlikely to recur for many years in the same location because the fuel is exhausted in their fire scars. The detailed data included in Appendix B demonstrate a clear causal relationship between the source and monitor for each day that DEQ requests concurrence. Thus, the human activity unlikely to recur or a natural event criterion is also satisfied.

7 No Exceedance *But For* this Event

The EER, 40 CFR 50.14(b)(1), directs EPA to exclude data only when an agency demonstrates an exceptional event caused a concentration in excess of NAAQS. It must generally be shown that the concentrations at the monitor would have been below the standard if the event had not occurred (i.e., *but for* the event.) The clear causal relationship information establishes the connection between the wildfires and the monitored value, and demonstrates that no other significant source is capable of causing the high monitor values. Finally, the analysis of historical fluctuations in section 3 demonstrates in accordance with EPA high wind guidance (EPA 2013c) that these events exceed the normal range of historical fluctuations above the mean value. The amount the event exceeds the historical average and the 95th percentile is one way to demonstrate the degree to which the event exceeds historical fluctuations.

Table 5 provides the quantitative no exceedance but for criteria for each requested monitor concentration at Pinehurst. The range of concentrations in Table 3 (95th and 99th percentile columns) and Table 5 (contribution columns) demonstrate that the values above the annual NAAQS of $12 \mu\text{g}/\text{m}^3$ would not have occurred but for the regional wildfire event. If the no exceedance but for evidence is uncertain, the weight of evidence, including a lack of alternative sources that could cause such levels and smoke visible in satellite images covering the region, is relied upon to make the case.

Table 5. Estimated range of concentrations contributing to Pinehurst values that would not have occurred but for the 2013 wildfires.

Date	PM_{2.5} Value at Monitor (µg/m³)	Contribution above 95th Percentile (µg/m³)	Contribution above Average (µg/m³)
7/1/2013	26.8	11.7	20.1
7/2/2013	22.6	7.5	15.9
7/25/2013	12	—	5.3
7/26/2013	12.2	—	5.5
7/29/2013	13.6	—	6.9
7/30/2013	17	1.9	10.3
7/31/2013	16.8	1.7	10.1
8/1/2013	12.5	—	5.8
8/7/2013	13.3	—	6.6
8/8/2013	13.5	—	6.8
8/9/2013	13.7	—	7
8/10/2013	15.2	0.1	8.5
8/11/2013	18.1	3	11.4
8/12/2013	16.4	1.3	9.7
8/13/2013	13.1	—	6.4
8/15/2013	13.6	—	6.9
8/16/2013	13.3	—	6.6
8/24/2013	16.4	1.3	9.7
8/25/2013	12.9	—	6.2
9/2/2013	12.2	—	5.5
9/3/2013	12.7	—	6
9/4/2013	16.2	1.1	9.5
9/5/2013	13.4	—	6.7
9/14/2013	14.4	—	7.7

8 Mitigation

8.1 EER Mitigation Requirement

The mitigation provisions of the EER (40 CFR 51.930) require the following (EPA 2013c):

(a) A State requesting to exclude air quality data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the national ambient air quality standards. At a minimum, the State must:

- (1) Provide for prompt public notification whenever air quality concentrations exceed or are expected to exceed an applicable ambient air quality standard;
- (2) Provide for public education concerning actions that individuals may take to reduce exposures to unhealthy levels of air quality during and following an exceptional event; and
- (3) Provide for the implementation of appropriate measures to protect public health from exceedances or violations of ambient air quality standards caused by exceptional events.

8.2 Daily Interagency Update Reports

When the severity of the wildfire impact was understood, DEQ quickly began holding daily phone calls with the US Forest Service and National Weather Service to gather information to pass on to other state and local agencies, including the Idaho Department of Health and Welfare state office and local health districts charged with more direct health protection. The daily interagency update reports provided during the daily conference calls disseminated monitoring data, forecasts, and satellite information to the local agencies so that all the best available information could be passed on to affected communities. An example of the daily DEQ update reports is included in Appendix D.

9 EER Procedural Requirements

The EER establishes specific procedural requirements that an air agency must follow to request data exclusion (EPA 2013c). Those requirements and DEQ's actions to meet them are summarized in Table 6.

Table 6. DEQ compliance with procedural requirements of the Exceptional Events Rule.

Exceptional Event Rule Procedural Requirements	DEQ Action/Intended Action
<i>A State shall notify EPA of its intent to exclude one or more measured exceedances of an applicable ambient air quality standard as being due to an exceptional event by placing a flag in the appropriate field for the data record of concern which has been submitted to the AQS database. 40 CFR 50.14(c)(2)(i).</i>	DEQ notified EPA of its intent to exclude these days.
<i>The placement of the flags and the submittal of an initial event description must be done not later than July 1st of the calendar year following the year in which the flagged measurement occurred. 40 CFR 50.14(c)(2)(iii).</i>	The flags and description of the events for all days included in this demonstration were in place by July 1, 2014.
<i>A State that has flagged data as being due to an exceptional event and is requesting exclusion of the affected measurement data shall, after notice and opportunity for public comment, submit a demonstration to justify data exclusion to EPA not later than the lesser of, 3 years following the end of the calendar quarter in which the flagged concentration was recorded or, 12 months prior to the date that a regulatory decision must be made by EPA. A State must submit the public comments it received along with its demonstration to EPA. 40 CFR 50.14(c)(3)(i)).</i>	DEQ provided an opportunity for public comment from July 29 to August 29, 2016.
<i>With the submission of the demonstration, the air agency must document that the public comment process was followed. 40 CFR 50.14(c)(3)(iv)).</i>	Document as part of the public comment period.

10 References

- Air Sciences, Inc. 2005. *2002 Fire Emission Inventory for the WRAP Region - Phase II*. Lakewood, CO: Western Regional Air Partnership.
- Colorado State University. 2015. *IMPROVE (Interagency Monitoring of Protected Visual Environments) Aerosol Data*. Fort Collins, CO.
http://vista.cira.colostate.edu/improve/Data/IMPROVE/improve_data.htm.
- DEQ (Idaho Department of Environmental Quality). 2014. *Crop Residue Burning Program 2013 Annual Report*. Boise, ID: DEQ. deq.idaho.gov/media/1036/crb-annual-report-entire-2013.pdf.
- Draxler, R.R., and G.D. Rolph. 2003. *HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model Access via NOAA ARL READY Website*. College Park, MD: NOAA Air Resources Laboratory.
- EPA (US Environmental Protection Agency). 2013a. *The 2011 National Emissions Inventory*. Durham, NC. <https://www.epa.gov/air-emissions-inventories>.
- EPA (US Environmental Protection Agency). 2013b. *Interim Exceptional Events Rule Frequently Asked Questions*. Research Triangle Park, NC. <https://www.epa.gov/air-quality-analysis/interim-exceptional-events-rule-frequently-asked-questions>.

- EPA (US Environmental Protection Agency). 2013c. *Interim Guidance on the Preparation of Demonstrations in Support of Requests to Exclude Ambient Air Quality Data Affected by High Winds Under the Exceptional Events Rule*. Research Triangle Park, NC. <https://www.epa.gov/air-quality-analysis/interim-guidance-preparation-demonstrations-support-requests-exclude-ambient>.
- EPA (US Environmental Protection Agency). 2015. *AirData - Access to Monitored Air Quality Data from EPA's Air Quality System (AQS) Data Mart*. Research Triangle Park, NC. <http://www.epa.gov/airdata/>.
- NASA (National Aeronautics and Space Administration). 2015. *NASA MODIS Satellite Images*. Madison, WI: University of Wisconsin. <http://ge.ssec.wisc.edu/modis-today/>.
- NIFC (National Interagency Fire Center). 2013. *Wildland Fire Summary and Statistics Annual Report 2013*. Boise, ID. <http://www.nifc.gov>.
- NOAA (National Oceanic and Atmospheric Administration). 2015. *Daily Weather Maps*. College Park, MD: Hydrometeorological Prediction Center, National Centers for Environmental Prediction. <http://www.wpc.ncep.noaa.gov/dailywxmap/>.
- NWCG (National Wildfire Coordination Group). 2015. *Historical Incident ISC-209 Report*. https://fam.nwcg.gov/fam-web/hist_209/report_list_209.
- WRCC (Western Regional Climate Center). 2013. *WestWide Drought Tracker Time Series Generator*. Reno, NV. <http://www.wrcc.dri.edu/wwdt/time/>.

Appendix A. Monitor Values

Table A-1. Pinehurst monitor values for all days during 2013 wildfire season, AQS 16-079-0017.^a

Date	Pinehurst POC 4 PM _{2.5} Primary (µg/m ³)	Pinehurst POC 1 PM _{2.5} Colocated (µg/m ³)
7/1/2013	26.8	—
7/2/2013	22.6	—
7/3/2013	14.3	8.1
7/4/2013	15.3	—
7/5/2013	7.5	—
7/6/2013	10.8	—
7/7/2013	11.7	—
7/8/2013	7.7	—
7/9/2013	6.5	4.1
7/10/2013	8.0	—
7/11/2013	6.2	—
7/12/2013	3.4	—
7/13/2013	4.1	—
7/14/2013	5.3	—
7/15/2013	5.9	5.1
7/16/2013	8.7	—
7/17/2013	11.0	—
7/18/2013	9.1	—
7/19/2013	9.8	—
7/20/2013	9.7	—
7/21/2013	9.0	6.7
7/22/2013	8.0	—
7/23/2013	7.9	—
7/24/2013	10.1	—
7/25/2013	12.0	—
7/26/2013	12.2	—
7/27/2013	8.4	6.8
7/28/2013	7.8	—
7/29/2013	13.6	—
7/30/2013	17.0	—
7/31/2013	16.8	—
8/1/2013	12.5	—
8/2/2013	4.0	2.0
8/3/2013	6.5	6.4
8/4/2013	8.1	5.7
8/5/2013	8.3	5.0
8/6/2013	10.6	6.8
8/7/2013	13.3	10.1

Date	Pinehurst POC 4 PM _{2.5} Primary (µg/m ³)	Pinehurst POC 1 PM _{2.5} Colocated (µg/m ³)
8/8/2013	14.5	10.6
8/9/2013	13.7	8.3
8/10/2013	15.2	9.5
8/11/2013	18.1	15.1
8/12/2013	16.4	11.5
8/13/2013	13.1	11.1
8/14/2013	11.8	7.8
8/15/2013	13.6	10.6
8/16/2013	13.3	8.5
8/17/2013	10.9	7.3
8/18/2013	7.0	4.7
8/19/2013	7.5	4.6
8/20/2013	6.0	4.3
8/21/2013	9.8	5.3
8/22/2013	8.8	6.7
8/23/2013	13.0	11.8
8/24/2013	16.4	11.9
8/25/2013	12.9	10.5
8/26/2013	10.1	7.0
8/27/2013	8.1	5.0
8/28/2013	9.5	6.3
8/29/2013	9.9	7.2
8/30/2013	5.6	3.1
8/31/2013	6.0	2.5
9/1/2013	11.2	5.8
9/2/2013	12.2	7.8
9/3/2013	12.7	—
9/4/2013	16.2	—
9/5/2013	13.4	—
9/6/2013	5.2	—
9/7/2013	3.7	—
9/8/2013	4.0	—
9/9/2013	7.2	—
9/10/2013	11.8	—
9/11/2013	12.2	—
9/12/2013	15.4	—
9/13/2013	13.2	8.5
9/14/2013	14.4	—

a. Text in red denotes dates requested for EPA concurrence in this document.

Appendix B. Pinehurst EER Daily Summaries

These daily summaries provide day-by-day detailed information to support the exceptional events request for each day requested, including the monitor values, air quality standard number, and Parameter Occurrence Codes (POCs) for each value on which DEQ is requesting concurrence. Explanations for the information contained in this appendix are provided below.

Summary of EER Evidence Tables

These tables contain concise, complete information supporting each EER element for each day in which EER concurrence is requested, along with reference to the main report section containing more complete explanations of the transport scenarios involved, alternative hypotheses, and other EER elements.

HYSPLIT Back Trajectories and MODIS Satellite Images

Daily satellite images are overlaid with HYSPLIT back trajectories and HMS fire detects. Terra (morning) or Aqua (afternoon) RGB True Color images show a snapshot of the smoke at the time of the satellite pass. HYSPLIT back trajectories were run for the 24-hour period ending at 23:59 on each day. New trajectories start hourly and have starting positions at the source of 0 m above ground level (agl), 500 m agl, and 1,000 m agl. HMS fire detects are all those identified by the MODIS and VIIRS satellites during the 24-hour period. The HMS Analyzed Smoke polygons contain visible smoke delineated by NOAA analysts from GOES satellite imagery.

Time Series Charts

Twenty-four hour time series charts are provided to depict the temporal pattern of hourly $PM_{2.5}$ concentration and meteorological parameters associated with each day. In addition, typical $PM_{2.5}$ concentrations during the same month in previous years are characterized for comparison.

Top chart: $PM_{2.5}$ with Average and 95th Percentile for Month (2010–2012)

2013 $PM_{2.5}$ —The red circles and line indicate the hourly $PM_{2.5}$ concentration for each hour for each day affected by wildfires in 2013.

July/August/September Average—The green dotted line with filled green triangle markers represents the average for the month for 3 years prior to 2013. Each value represents 90 or 93 values averaged together.

July/August/September 95th percentile—The blue diamonds and dotted line represent the 95th percentile value for the identified month from the 2010–2012 data set. The 95th percentile is used to represent the upper limit of the normal historical fluctuations for each hour, based on EPA guidance for the 24-hour normal range between average and 95th percentile. Hourly values above this line indicate an exceptional hourly value that is beyond normal for that hour and month.

Middle Chart: Wind Speed and Wind Direction

Wind Speed—The purple diamonds and solid line represent the wind speed in meters per second (m/s) recorded at the DEQ meteorological station in Pinehurst. The wind sensor is at 10 m agl.

Wind Direction, deg—The blue open squares represent the wind direction for the hour at the DEQ meteorological station.

Bottom Chart: Solar Radiation and Temperature

Temperature, °F—The larger blue-filled circles represent the temperature at 2 m agl as measured at the DEQ meteorological station. It is included to indicate when the temperature dips below 40°F—the point at which residential wood combustion is beginning to be used.

Solar Radiation, W/m²—The green triangles and green line represent the solar radiation, in Watts per square meter (W/m²) measured at the DEQ meteorological station. The solar intensity and cycle indicate when solar-driven upslope and up-valley flows may be expected and when gravity-driven downslope and down-valley flows may be prevalent before sunrise and after sunset.

Acronyms Used in the Summaries

EER—Exceptional Events Rule

nRCP—Not Reasonably Controllable or Preventable

HF—Exceeds Historical Fluctuations

CCR—Clear Causal Relationship

AAQ—Affects Air Quality

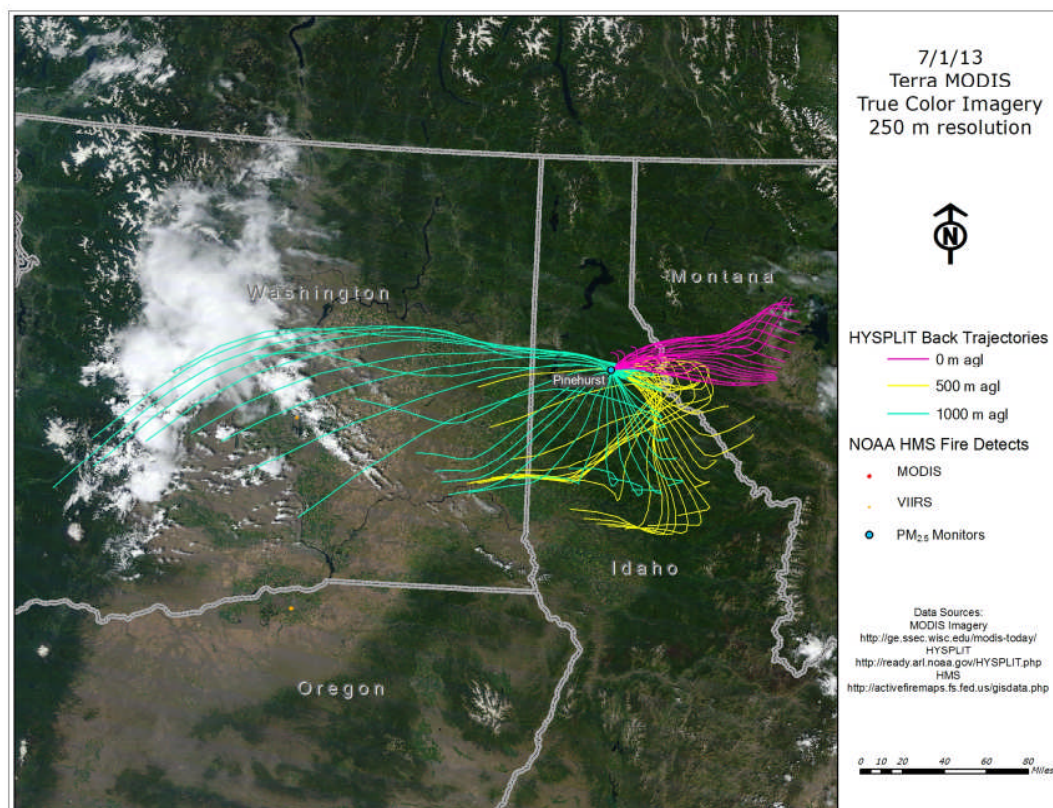
NE/HAURL—Natural Event or Human Activity Unlikely to Recur at the same location

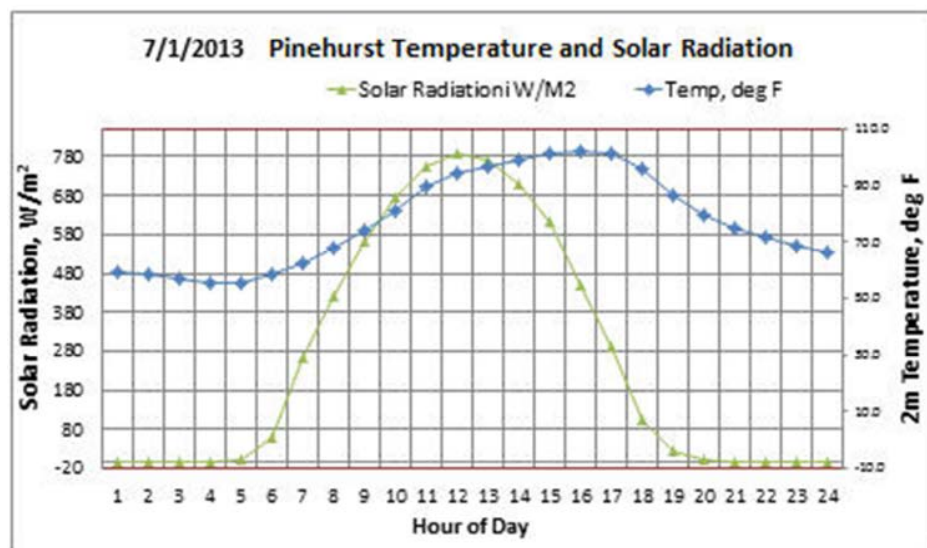
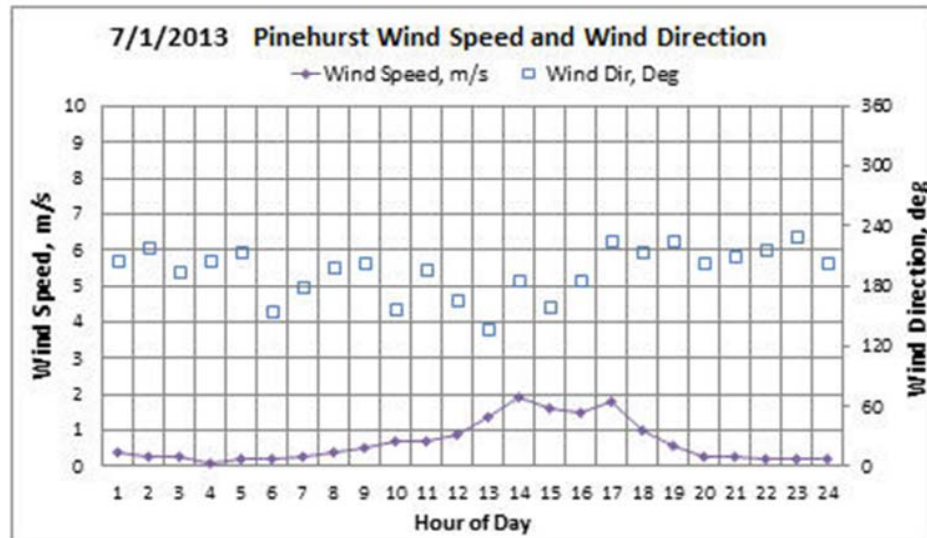
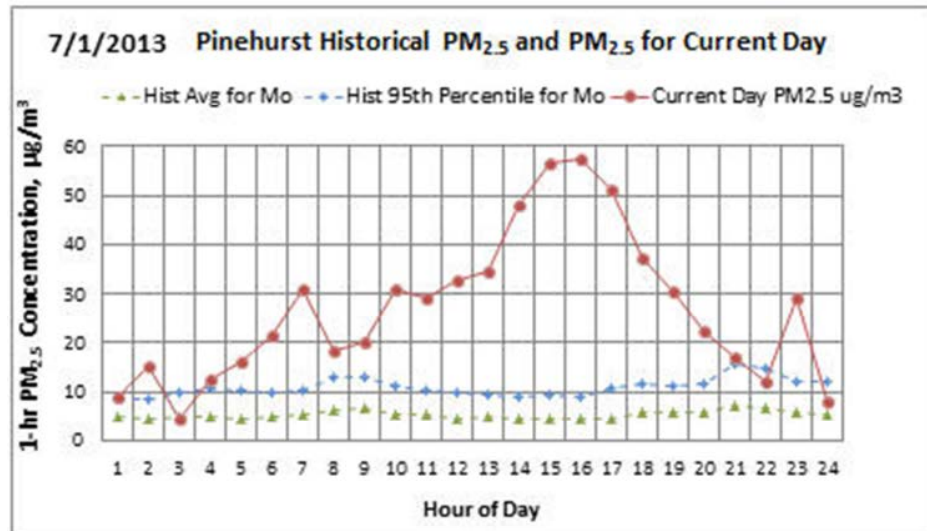
NEBF—No Exceedance But For Event

RWC—Residential Wood Combustion

July 1, 2013

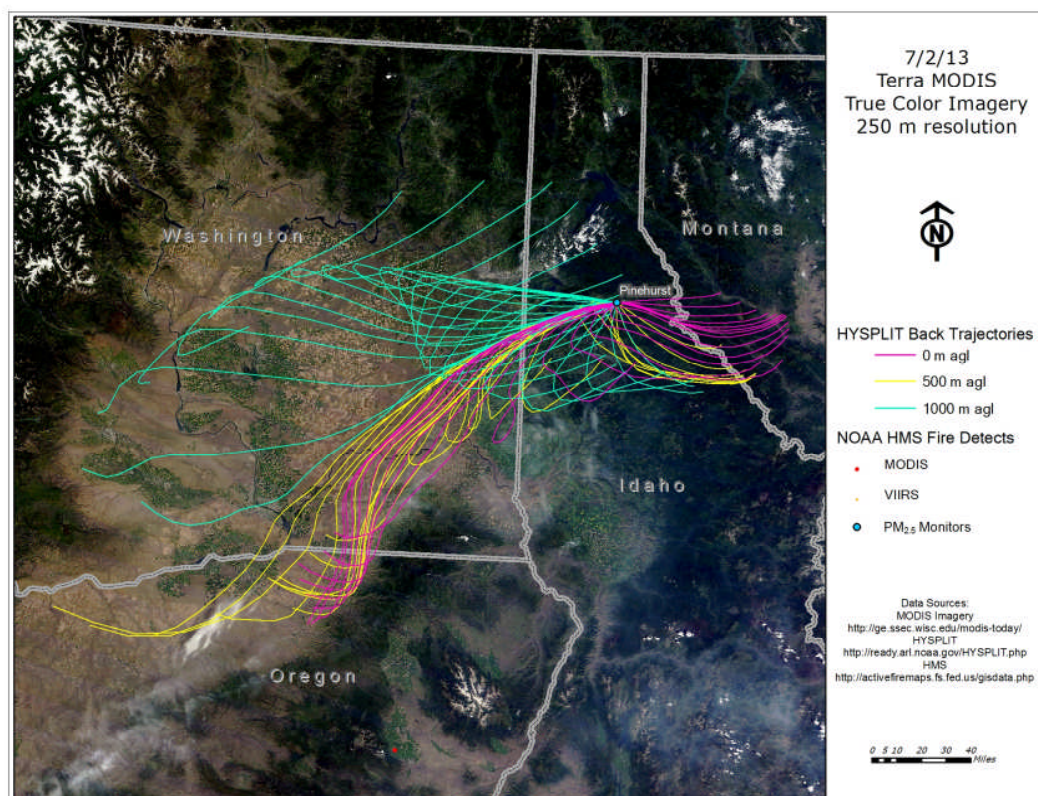
Summary of EER Evidence for Pinehurst Monitor Value, 26.8 $\mu\text{g}/\text{m}^3$ on 7/1/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	100th percentile seasonally (vs. 2004–2012). (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Strong upper-level high-pressure ridge centered over the Great Basin with ridge axis running due north along the Alberta/Saskatchewan border into southern Idaho and Nevada.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Contiguous with other wildfire-caused, EE-flagged days. Time series shows midday peak over 50 $\mu\text{g}/\text{m}^3$ well above 95th percentile (10 $\mu\text{g}/\text{m}^3$) for ~16 hours with no known alternative sources in midsummer. HMS Smoke Text Product indicates wildfire smoke in northern Idaho.
	Alternative Hypotheses	Evening temperature >60°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7, for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed 11.7–20.1 $\mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

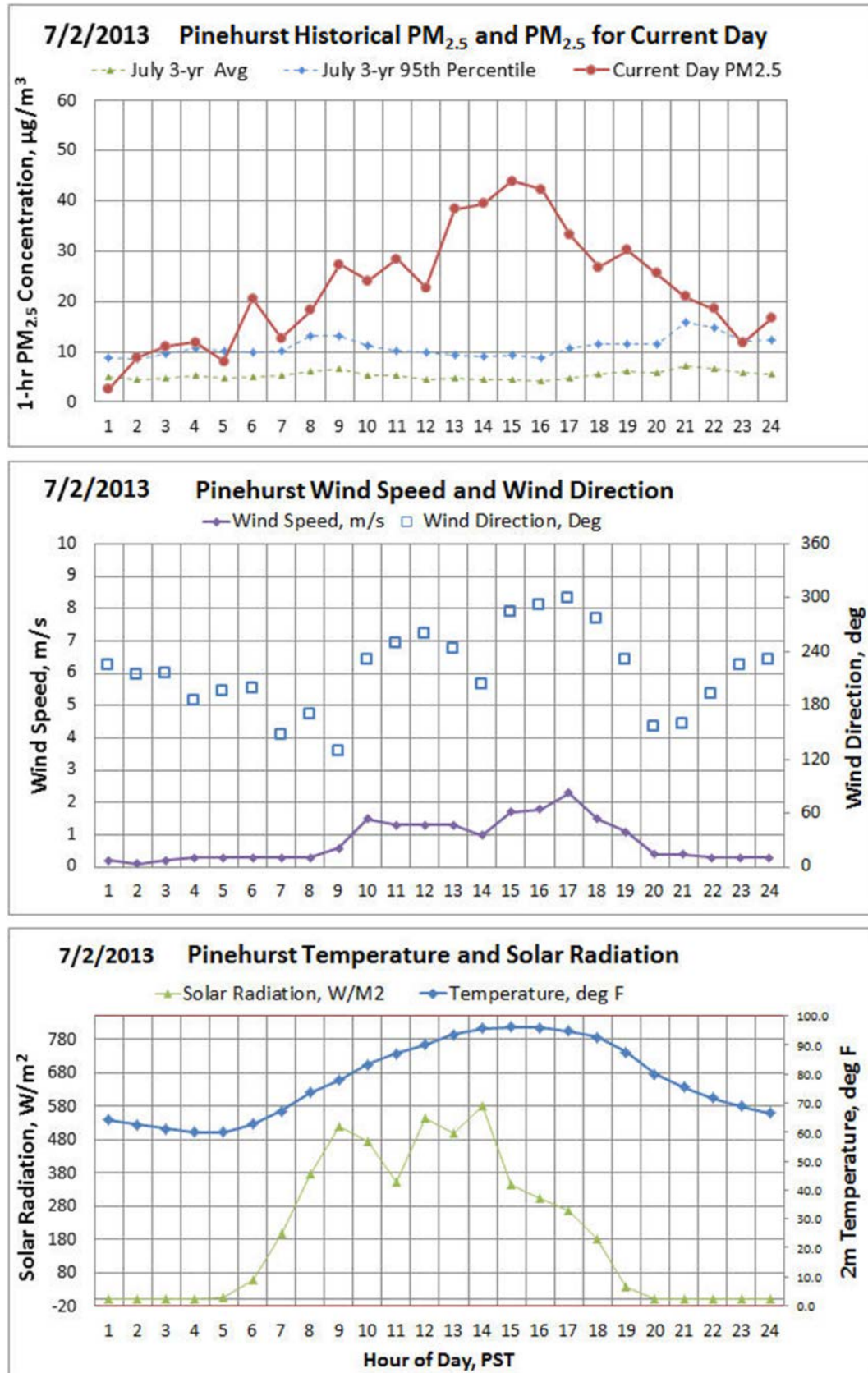




July 2, 2013

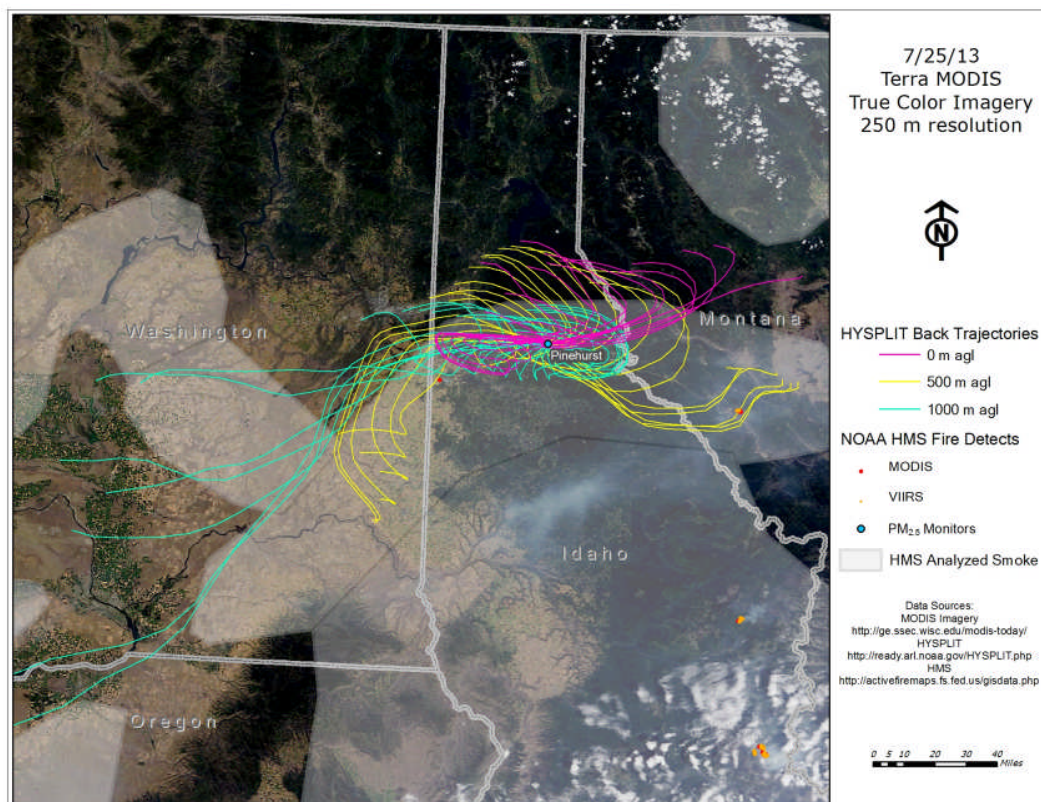
Summary of EER Evidence for Pinehurst Monitor Value, 22.6 $\mu\text{g}/\text{m}^3$ on 7/2/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	99th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Strong upper-level high-pressure ridge centered over the Great Basin with ridge axis running northeast along the Alberta/Saskatchewan border. Associated surface pressure is weak with gradients of 0.4 mb/150 mi.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Satellite photo shows light smoke covering northern and central Idaho, southeastern Washington, and northeastern Oregon. Back trajectories intersect the smoke. PM _{2.5} concentration are above the 95th percentile for most of the day, peaking at about 43 $\mu\text{g}/\text{m}^3$ at 3 p.m.
	Alternative Hypotheses	Evening temperature >60°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July–September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed 7.5–15.9 $\mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

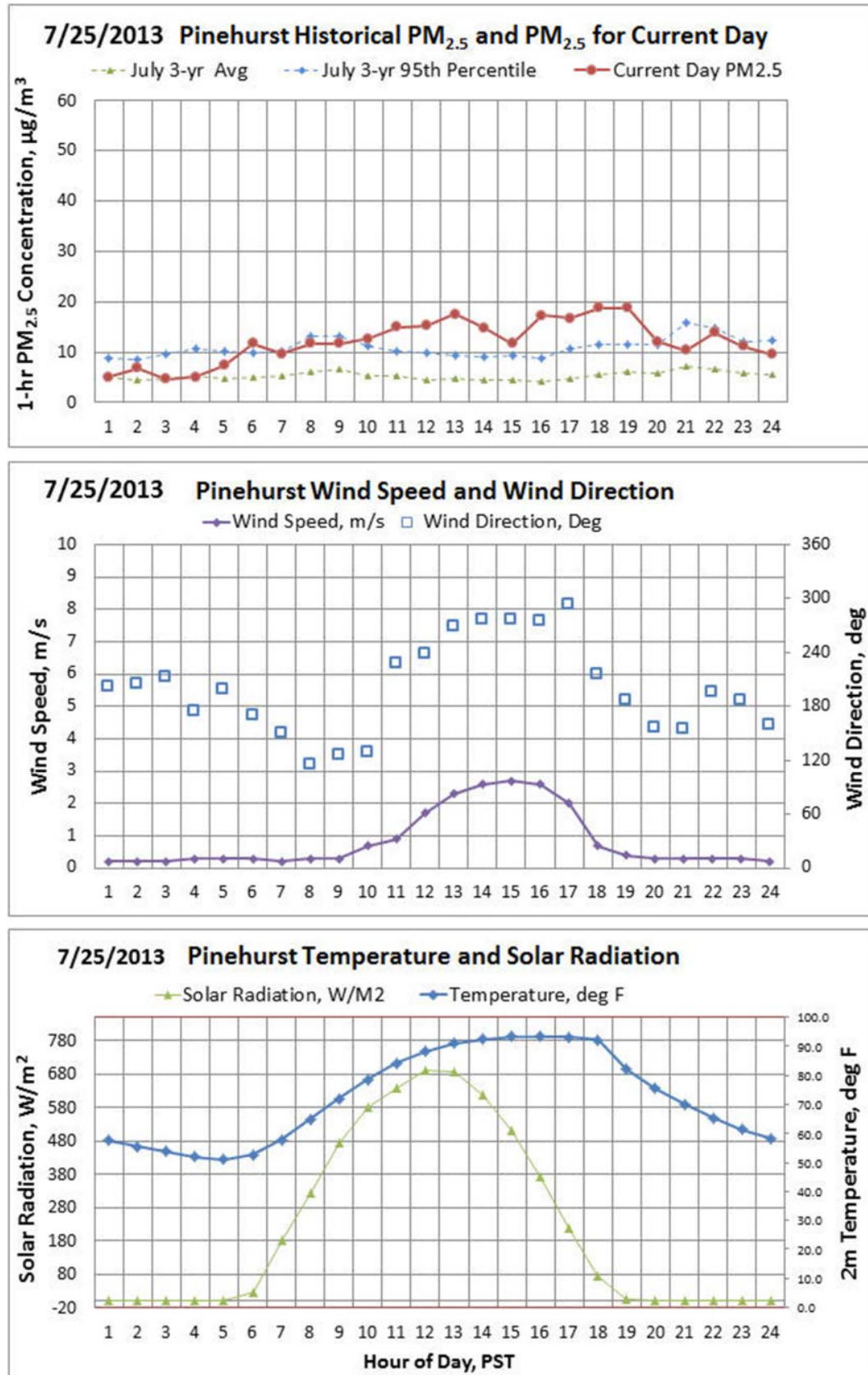




July 25, 2013

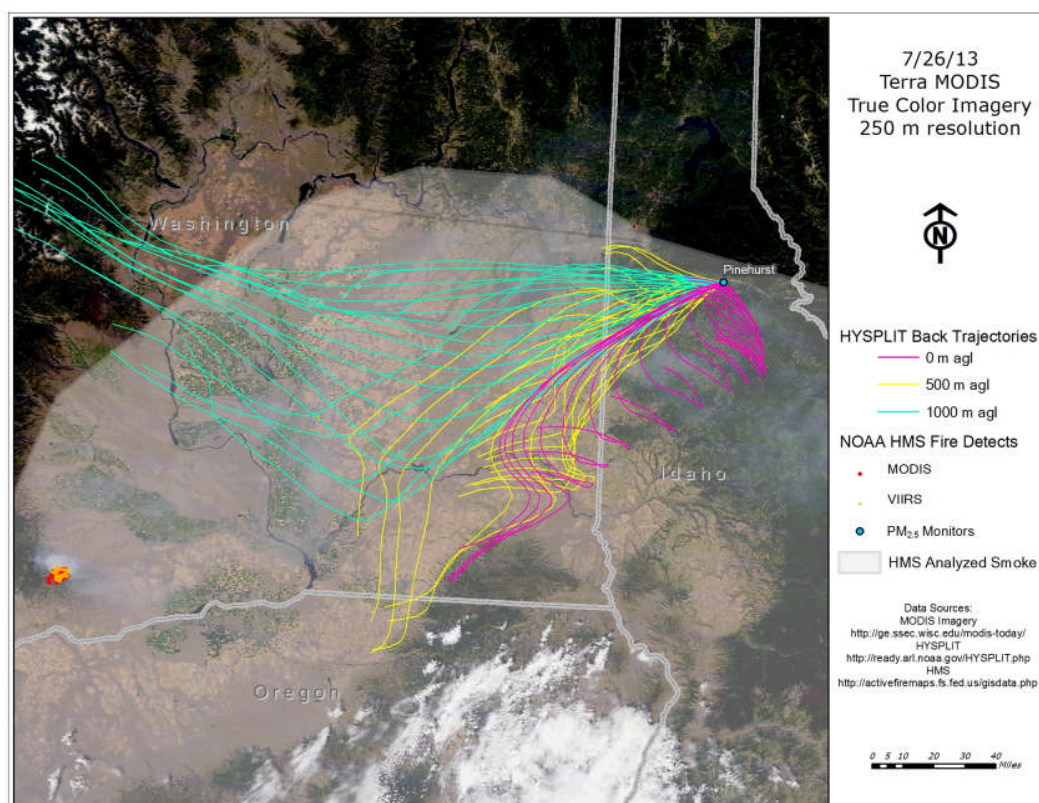
Summary of EER Evidence for Pinehurst Monitor Value, $12 \mu\text{g}/\text{m}^3$ on 7/25/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2)
HF	Percentile Rankings	93rd percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 2 (Section 4)
	Weather Conditions	Upper-level Omega block is evident over northern Alberta with associated ridging into southern Idaho. A thermal trough exists along the lee side of the Cascades at the surface.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	MODIS and HMS data show light smoke patches across the Pinehurst region. Back trajectories are short, indicating a lack of air movement and stagnation. $\text{PM}_{2.5}$ concentrations are relatively flat but are sustained above the 95th percentile for 9 hours starting at 11 a.m.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $5.3 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

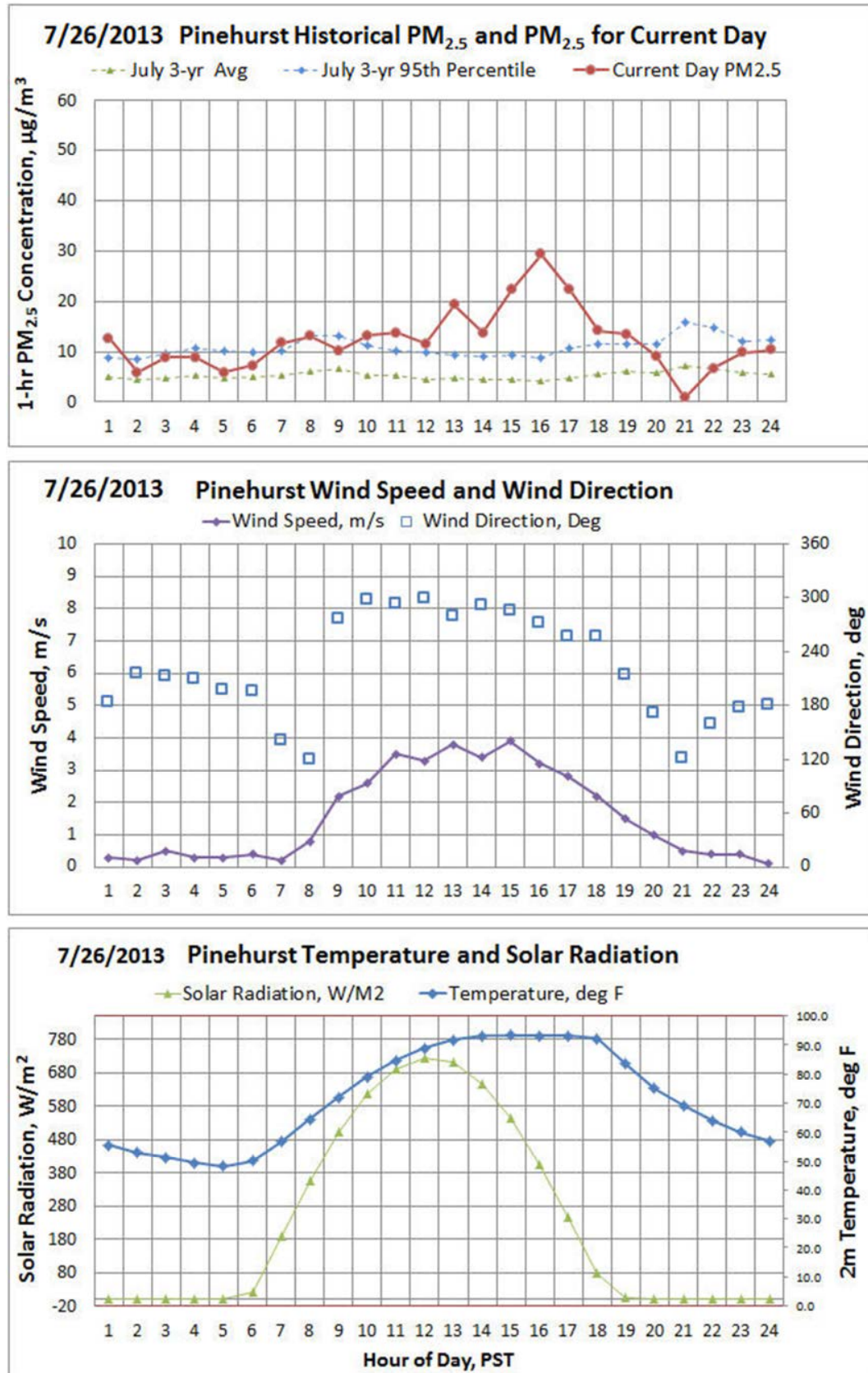




July 26, 2013

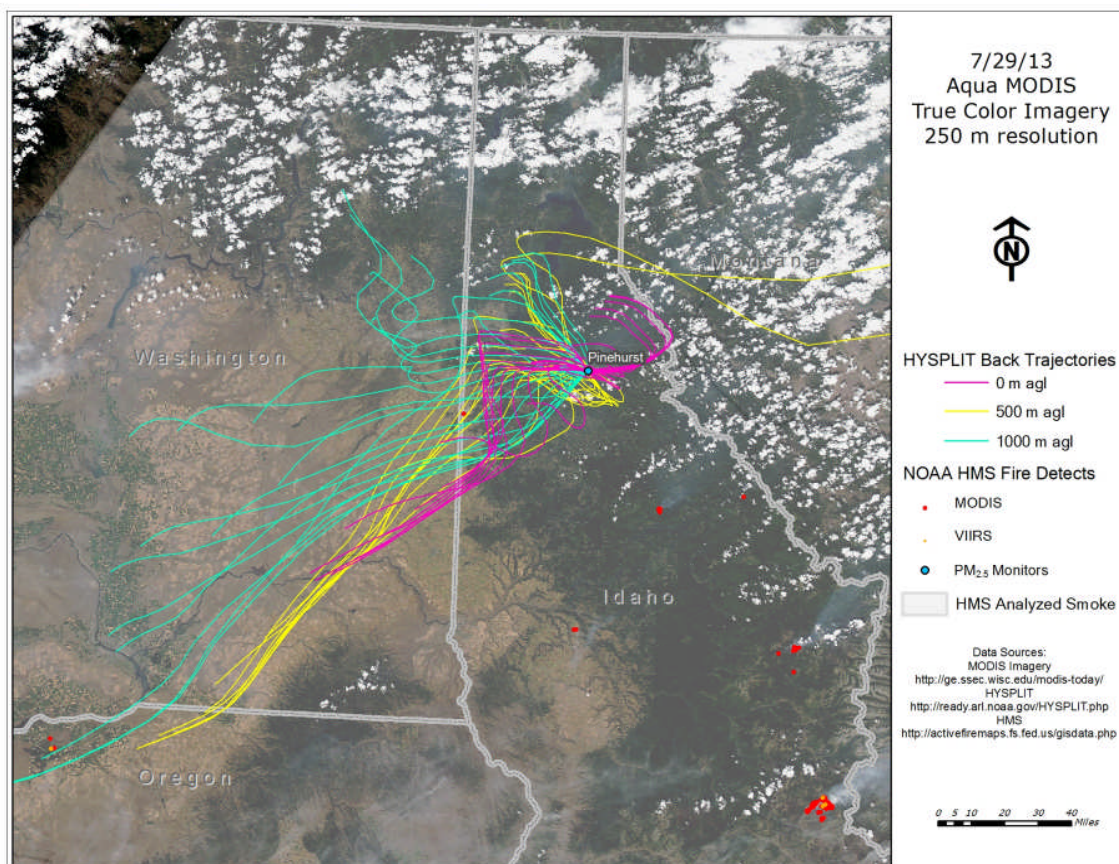
Summary of EER Evidence for Pinehurst Monitor Value, 12.2 $\mu\text{g}/\text{m}^3$ on 7/26/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	93rd percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Upper-level Omega block centered along the Alberta/Saskatchewan border with strengthening Four Corners high pressure in the southwestern US provides a consistent ridge over Idaho. Surface pressures again indicate a thermal trough along the lee of the Cascades in eastern Washington.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Light smoke is present at Pinehurst from both smoke data sources. Back trajectories intersect smoke. PM _{2.5} concentration rises sharply in the afternoon, reaching a maximum of 29 $\mu\text{g}/\text{m}^3$ at 4 p.m.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July–September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 5.5 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation:	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

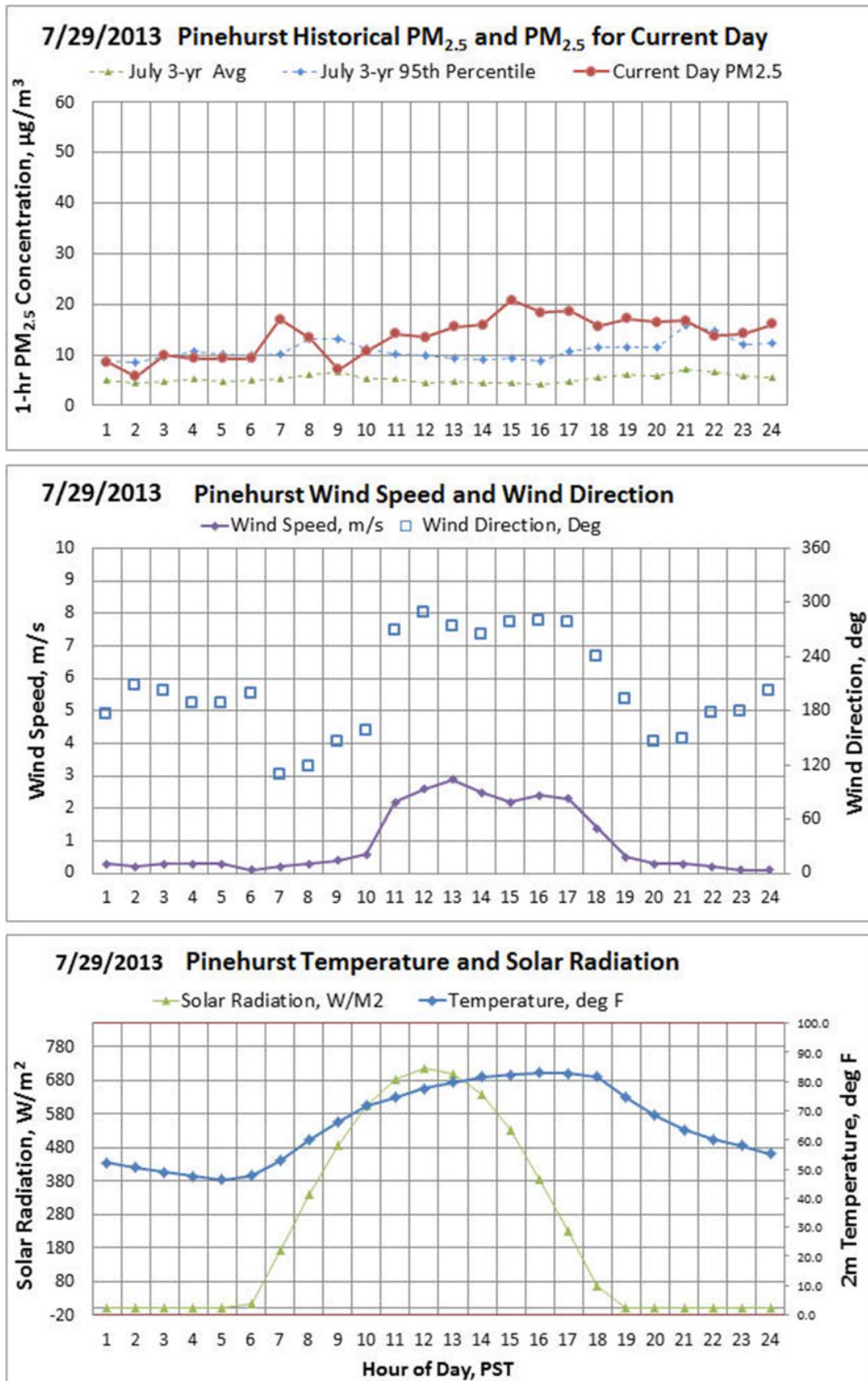




July 29, 2013

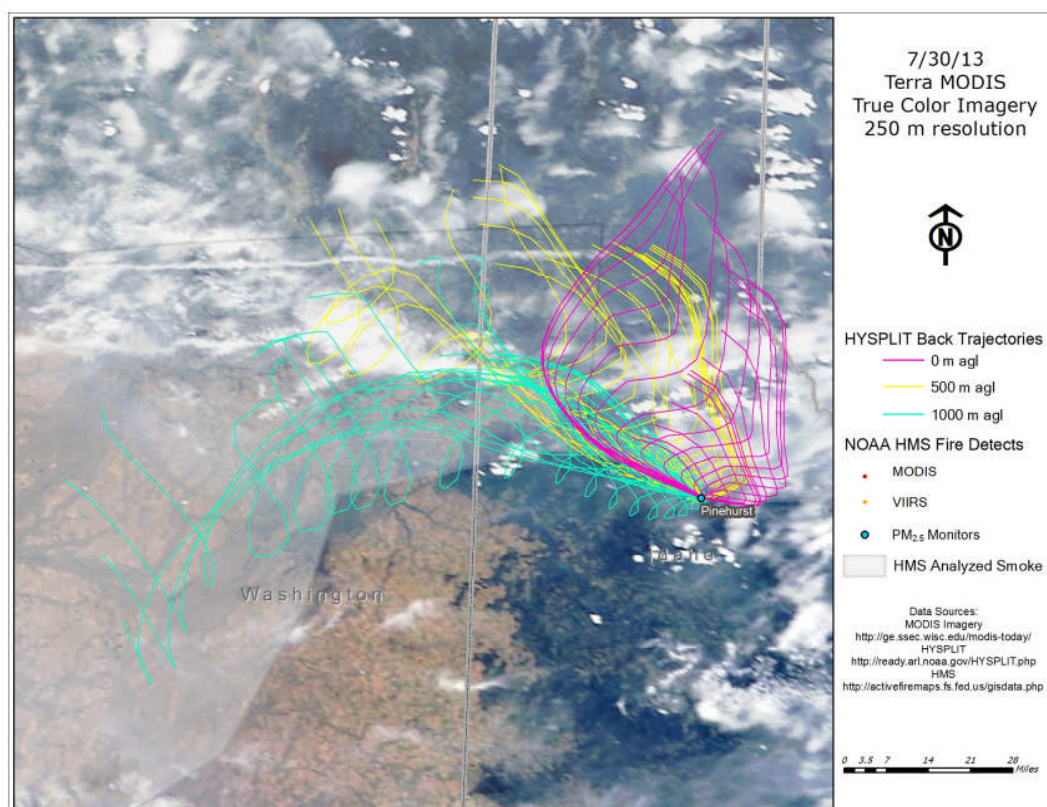
Summary of EER Evidence for Pinehurst Monitor Value, $13.6 \mu\text{g}/\text{m}^3$ on 7/29/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Upper-level flow patterns depict zonal flow over the Pacific Northwest; however, a thermal trough exists once more at the surface in the lee of the Cascades.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Various wildfires are sending up plumes in ID, WA, and OR. Light smoke covers the region. Back trajectories intersect light smoke and fire detects. $\text{PM}_{2.5}$ concentrations are above the 95th percentile for a total of 13 hours.
	Alternative Hypotheses	Evening temperature $>45^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $6.9 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

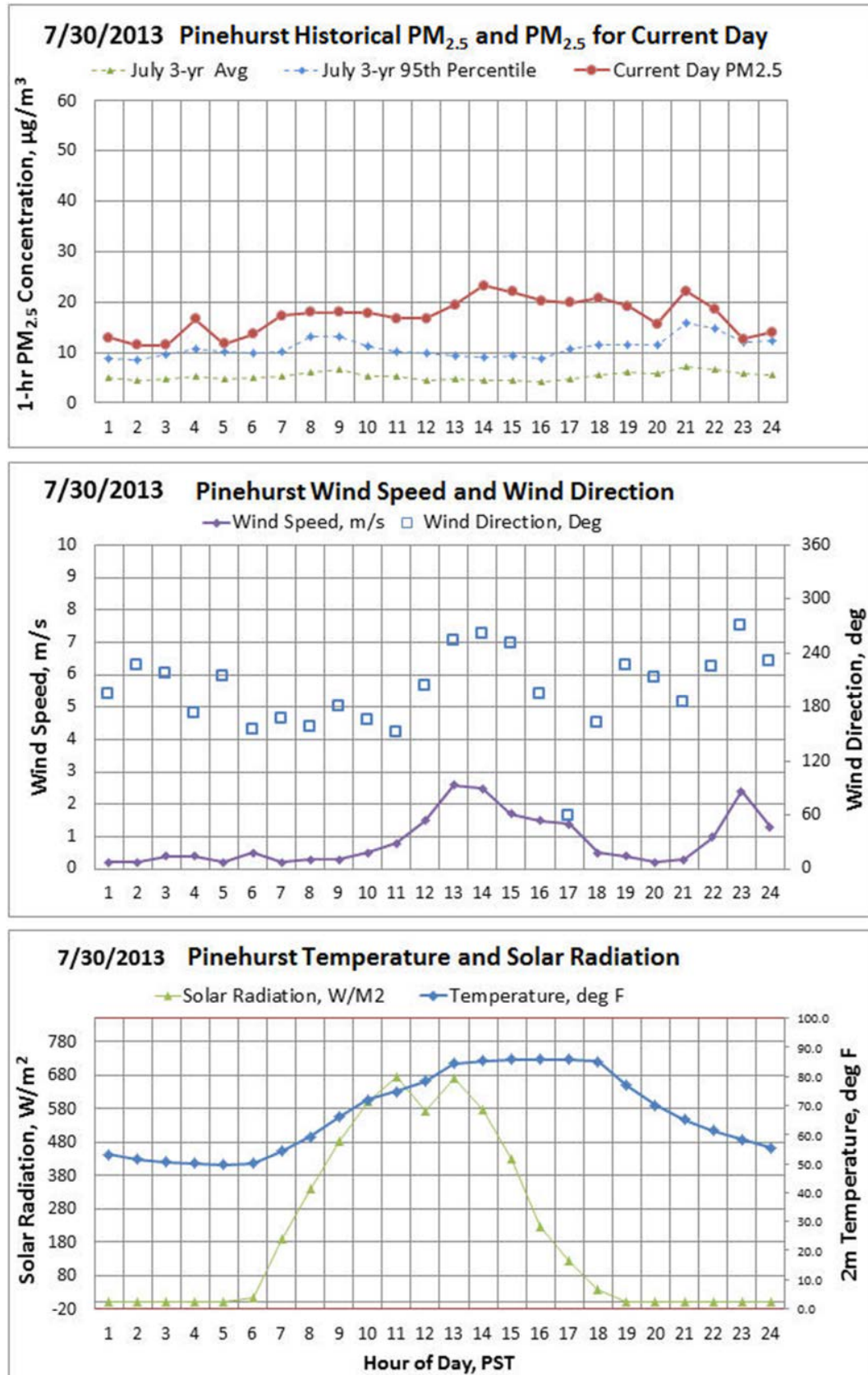




July 30, 2013

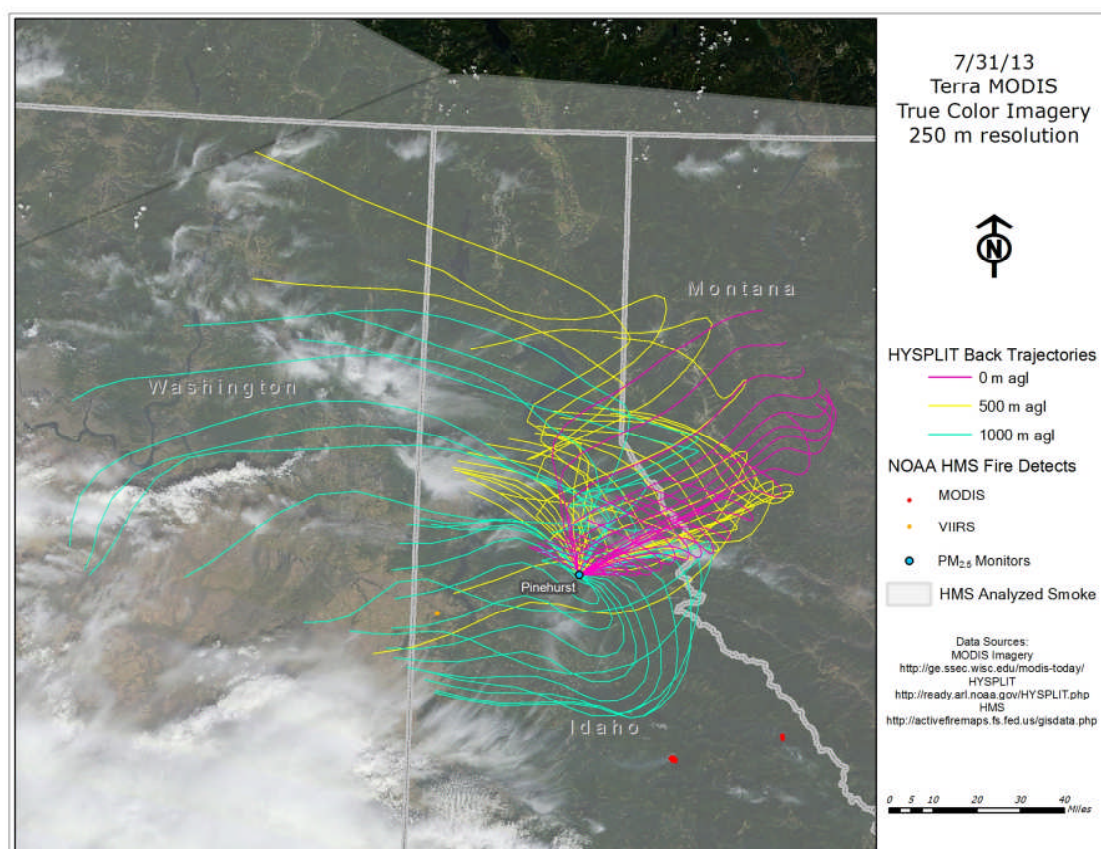
Summary of EER Evidence for Pinehurst Monitor Value, $17.0 \mu\text{g}/\text{m}^3$ on 7/30/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	97th percentile seasonally (vs. 2004-2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	A weak upper-level shortwave located off the Washington coast provides moderate instability for scattered cloud cover; however, a stationary front at the surface running from southern British Columbia to South Dakota limits horizontal movement of the atmosphere.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Moderate smoke mixed with clouds blankets the region around Pinehurst. Short back trajectories intersect smoke and indicate stagnant conditions. $\text{PM}_{2.5}$ concentrations further indicate stagnant conditions with a flat trace remaining above the 95th percentile for most of the day.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed 1.9 to $10.3 \mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

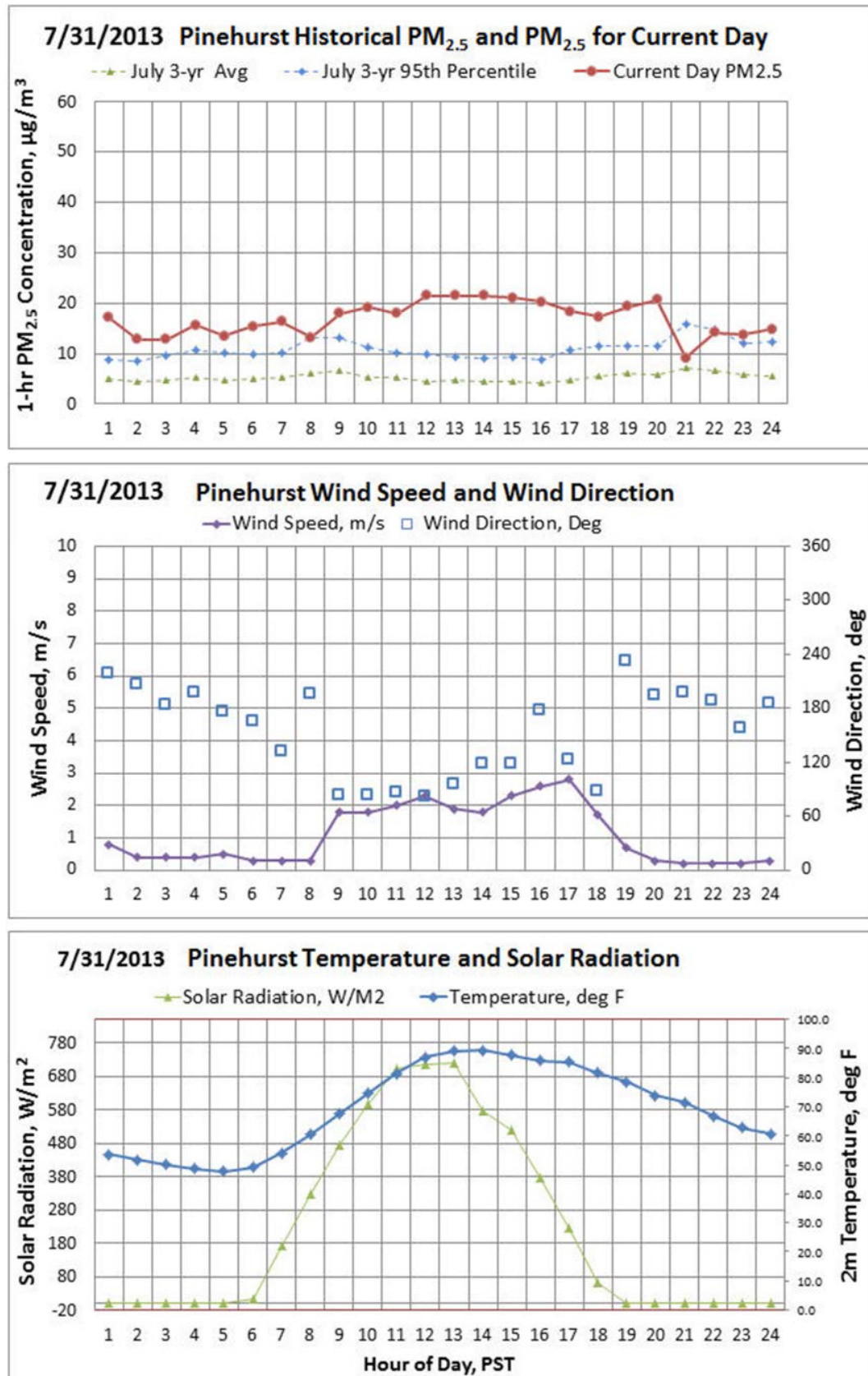




July 31, 2013

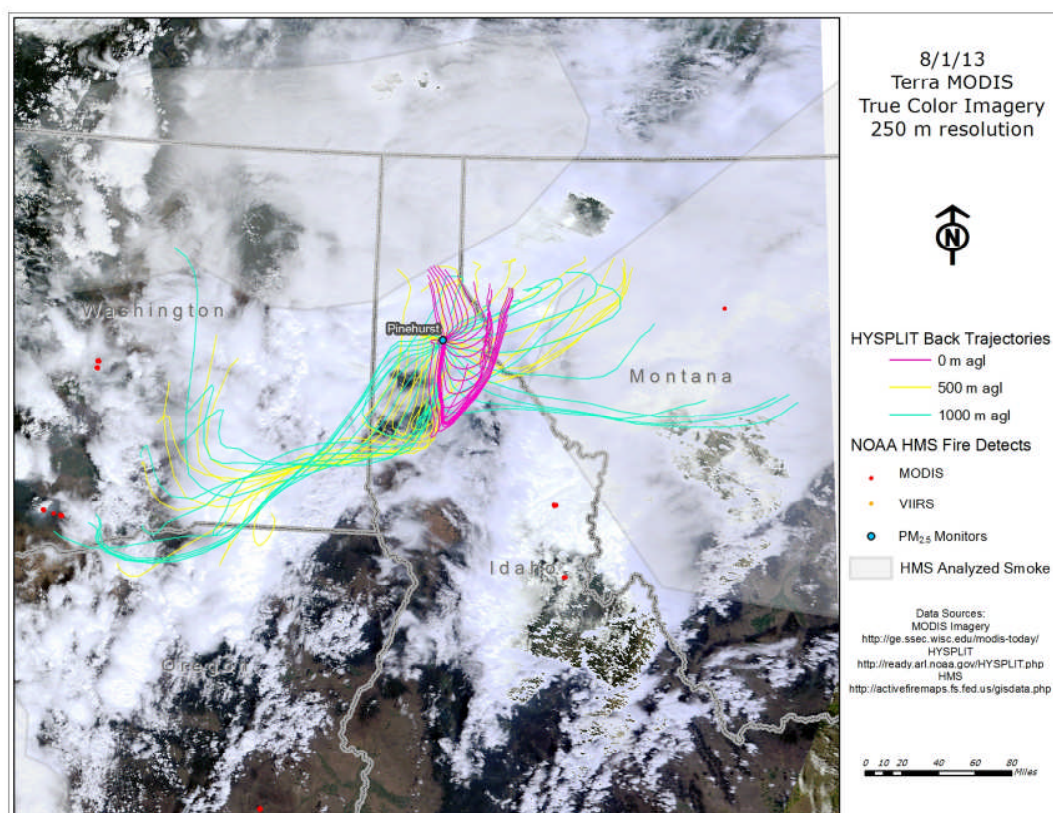
Summary of EER Evidence for Pinehurst Monitor Value, $16.8 \mu\text{g}/\text{m}^3$ on 7/31/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	96th percentile seasonally (vs. 2004-2012) (Section 3)
CCR	Conceptual Model	Scenario 2 (Section 4)
	Weather Conditions	The upper-level low off the Oregon/Washington coast developed into a Rex block extending from the Gulf of Alaska to California with northern Idaho on the eastern edge and under an upper-level ridge.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Stagnant conditions continue with trajectories backing around the compass and not straying too far from Pinehurst. HMS analyzed smoke identifies light smoke covering the region and HMS detects 3 fires to the south of Pinehurst. Hourly concentrations remain flat and above the 95th percentile for the most part.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed $1.7\text{--}10.1 \mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

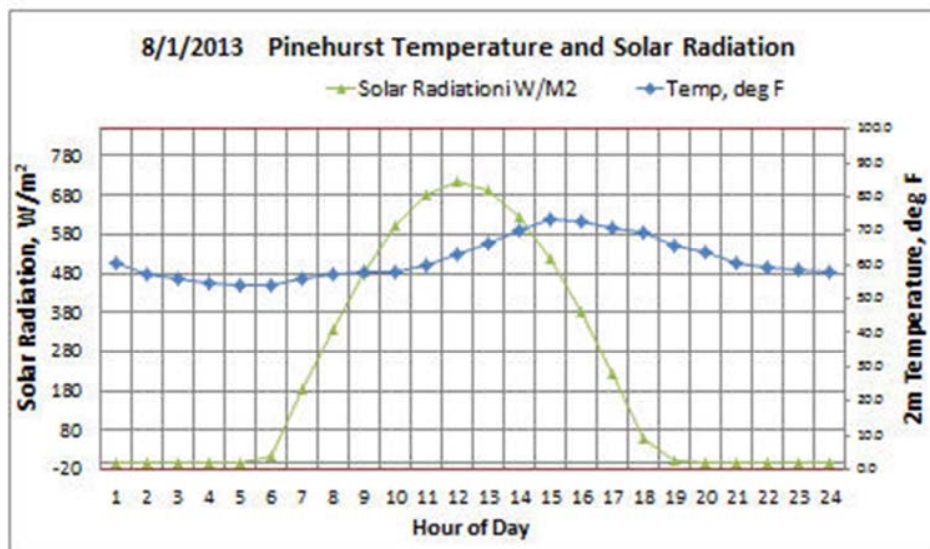
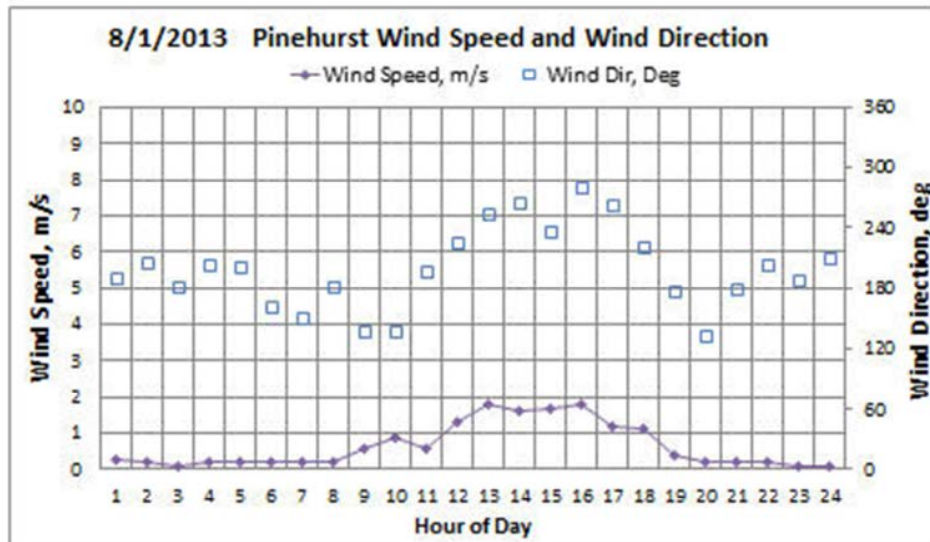
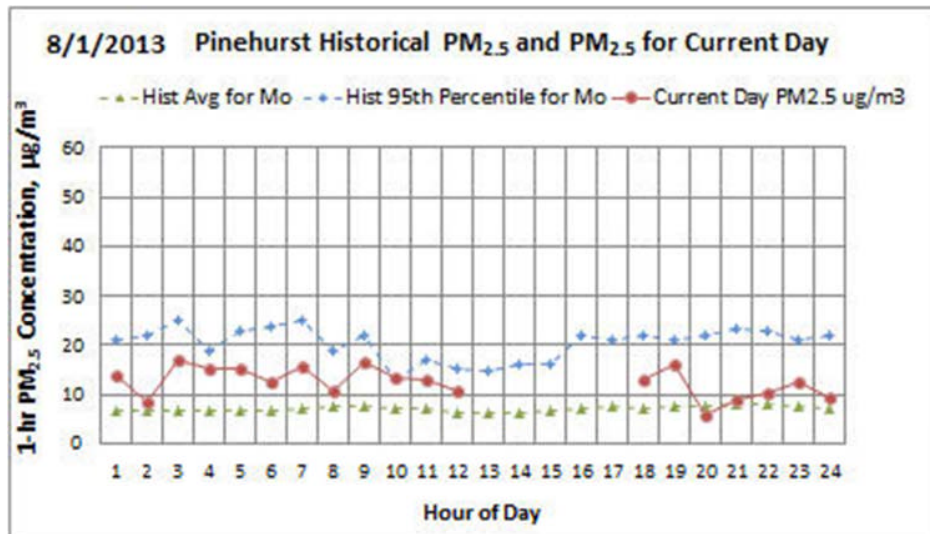




August 1, 2013

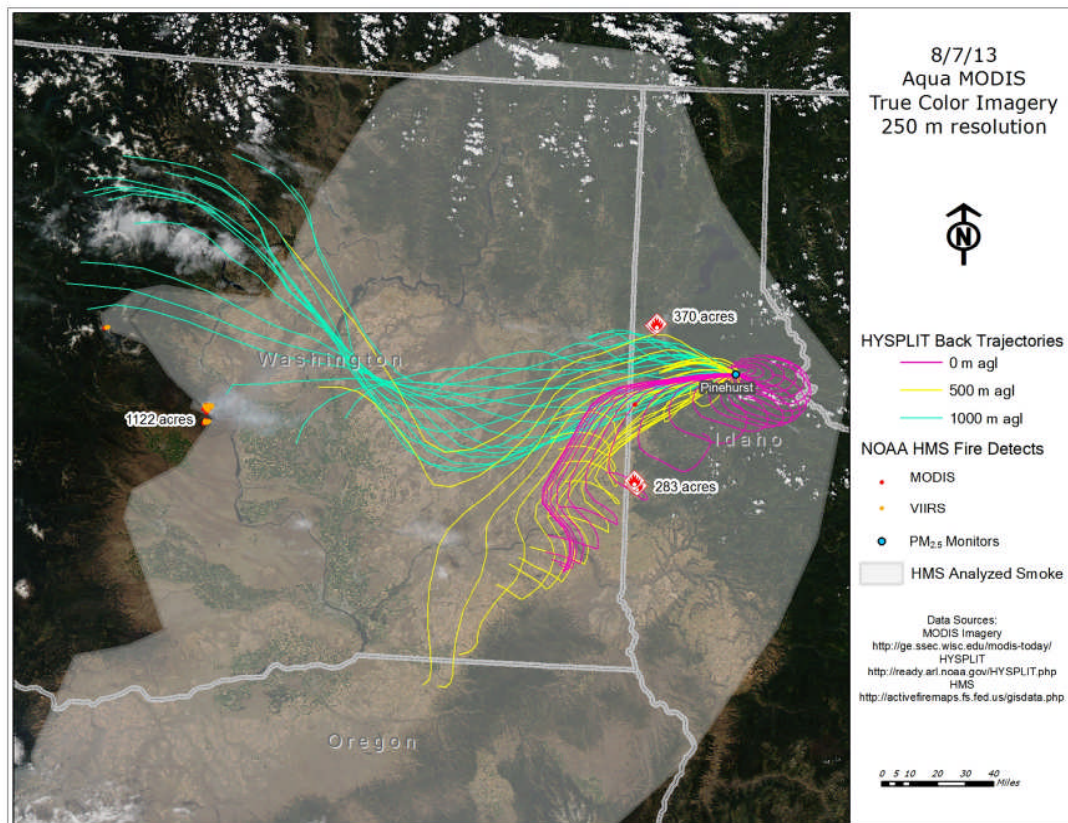
Summary of EER Evidence for Pinehurst Monitor Value, 12.5 $\mu\text{g}/\text{m}^3$ on 8/1/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	93rd percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 2 (Section 4)
	Weather Conditions	An upper-level cut-off low located off the Pacific Coast and along the Oregon/Washington border amplified ridging over the interior of the Great Basin and northern Idaho. A surface stationary front bisects Idaho from south-central Oregon to the Colorado/Wyoming border.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Cloudy but contiguous with wildfire-EE days, there is evidence of smoke from HMS analyzed smoke and HYSPLIT back trajectories to known wildfires. All hours but one above historical average for August, and no alternative sources such as CRB or RWC due to time of year and temperature.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–5.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 5.8 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

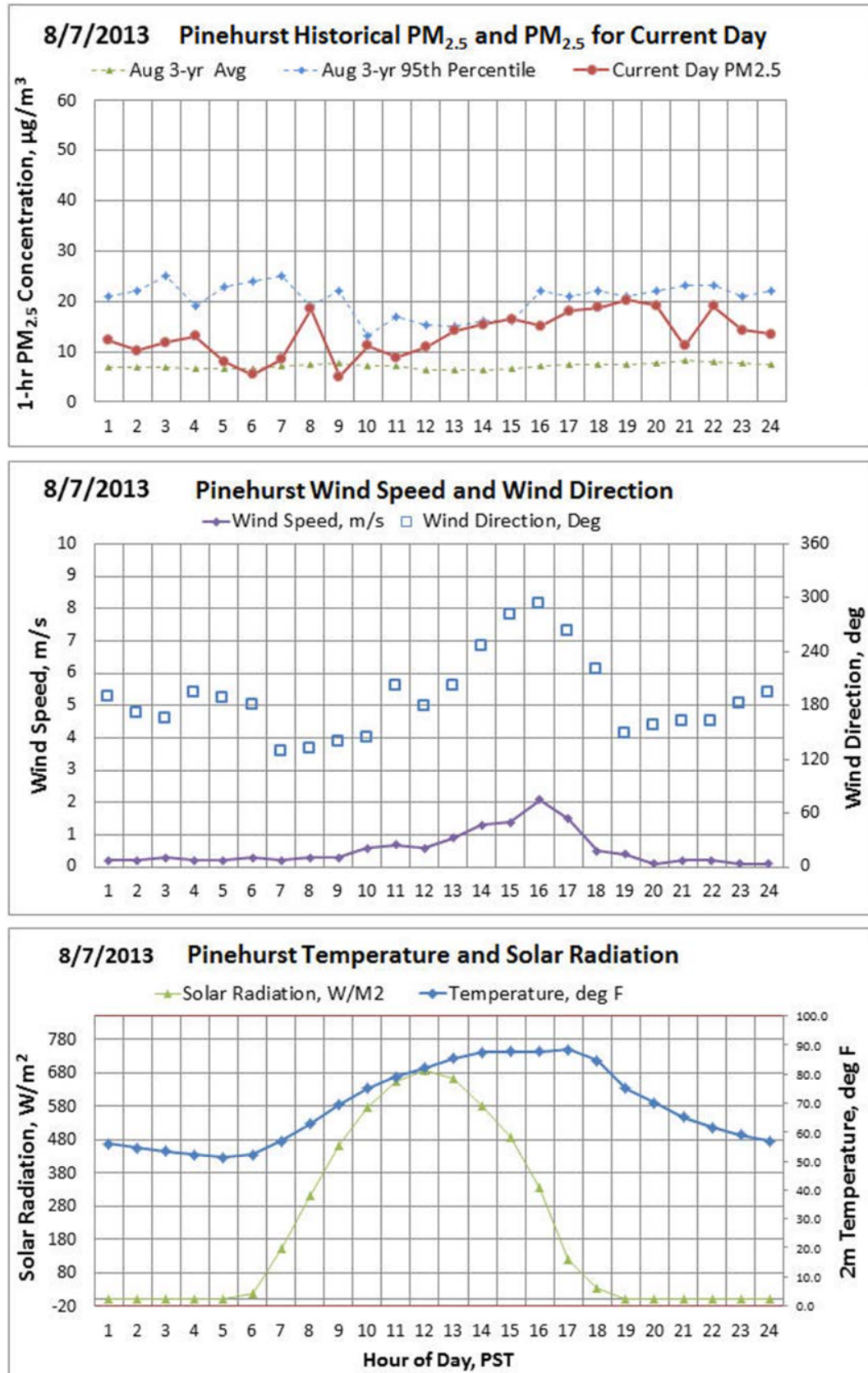




August 7, 2013

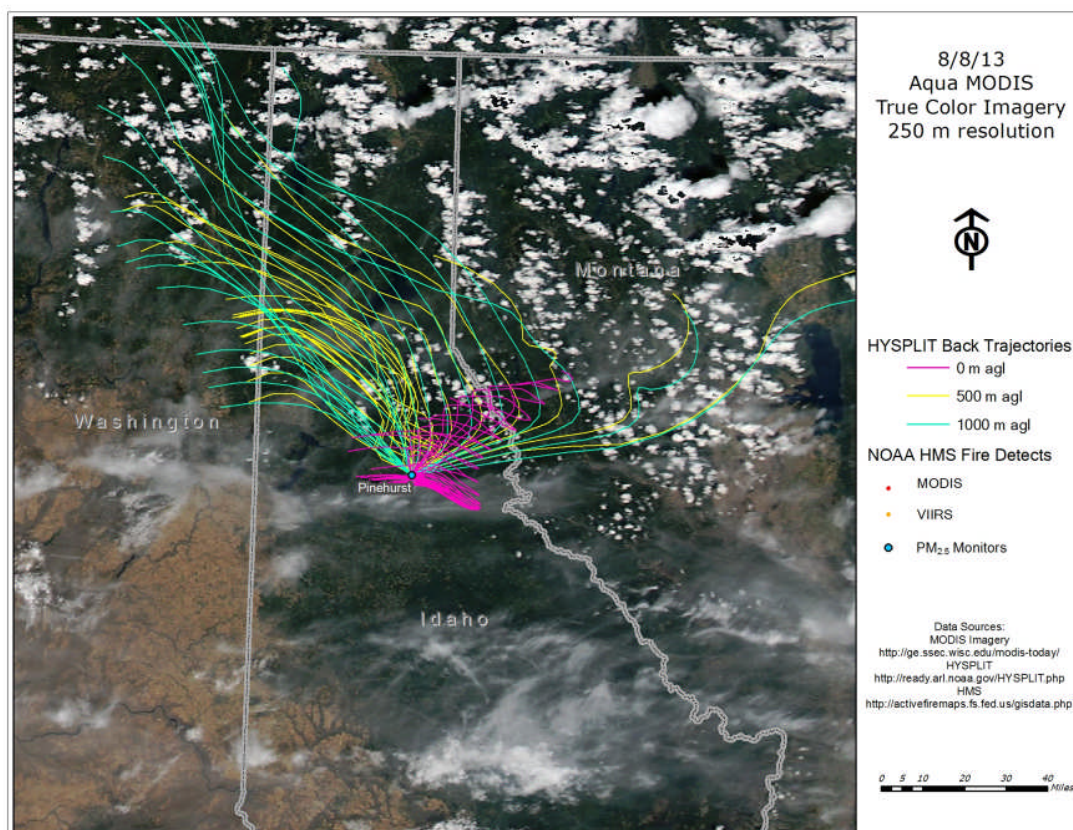
Summary of EER Evidence for Pinehurst Monitor Value, 13.3 $\mu\text{g}/\text{m}^3$ on 8/7/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	An upper-level cut-off low located slightly northwest of San Francisco generated minor ridging over the interior of the Great Basin and northern Idaho. A surface stationary front bisects Idaho from British Columbia to Boise before turning east.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Colockum Tarps fire in central WA sends a moderate plume to the east, while HMS identifies light smoke throughout the region. Back trajectories indicate westerly and southwesterly flow. Hourly concentrations shows values elevated above average but below 95th percentile.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3). Crop burns to NW of Pinehurst started at 2 pm, lasted an hour, and generated little ground smoke that moved NE (see Supplemental Materials for 8/7/2013, Appendix E).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6.6 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

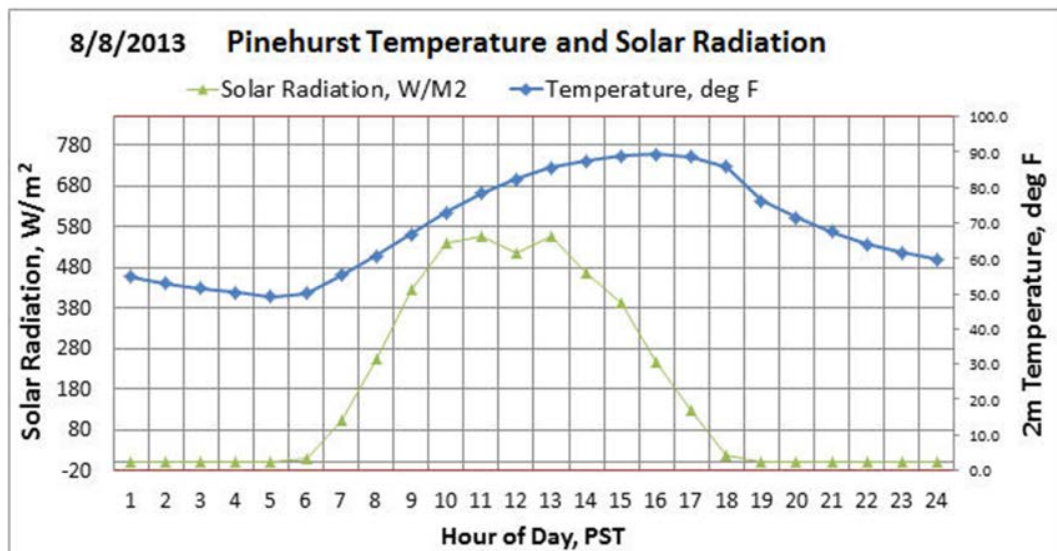
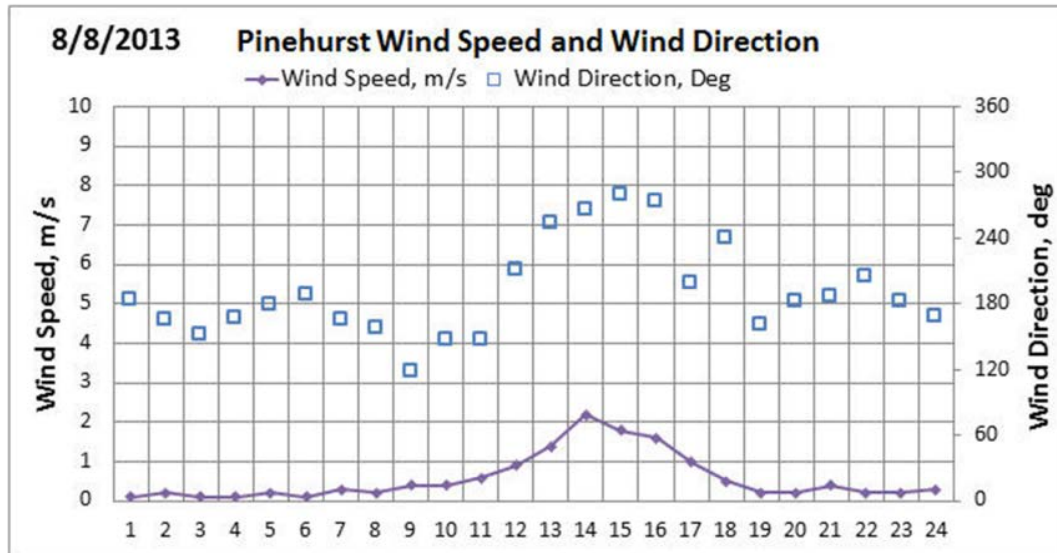
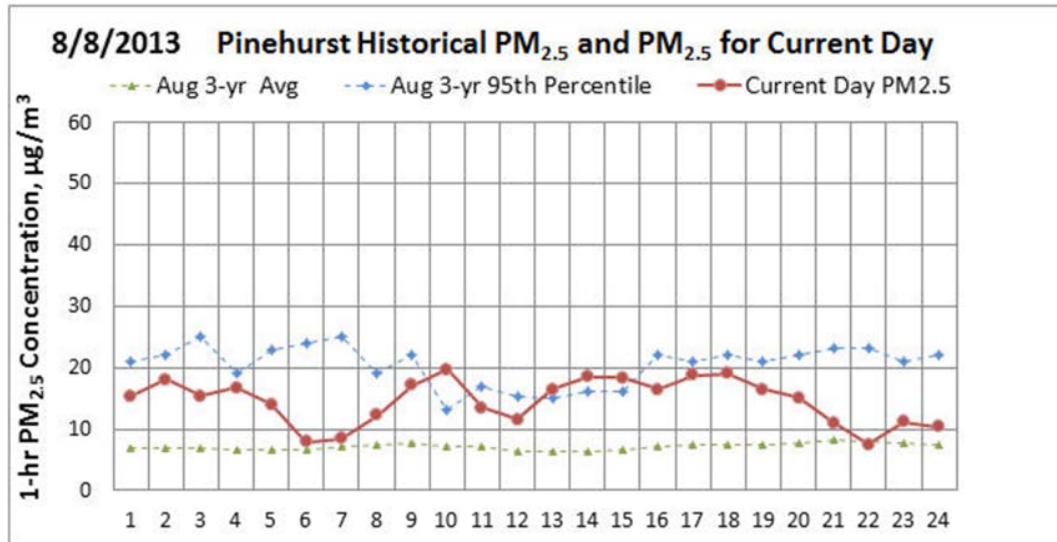




August 8, 2013

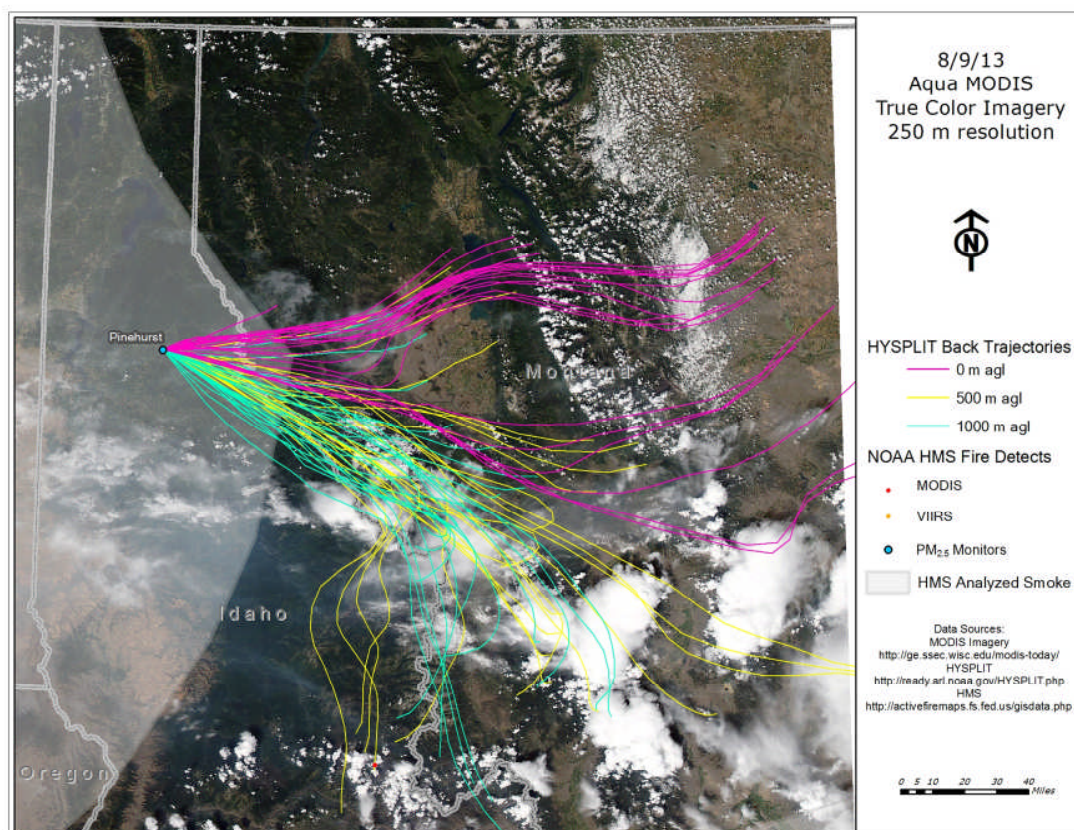
Summary of EER Evidence for Pinehurst Monitor Value, $14.5 \mu\text{g}/\text{m}^3$ on 8/8/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	95th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 2 (Section 4)
	Weather Conditions	Very minimal change from previous day as the upper-level cut-off low-pressure system has strengthened and remained in the same location allowing the upper-level ridging over Idaho to strengthen as well.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Light smoke visible in the region in MODIS imagery. Local wind speeds are very low, suggesting smoke from previous days remains in Pinehurst.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $7.8 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

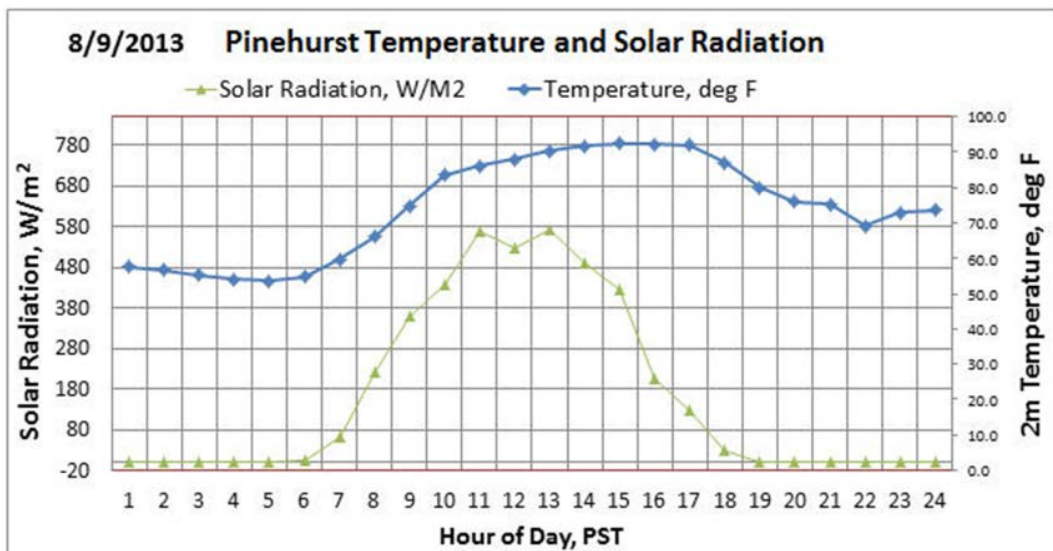
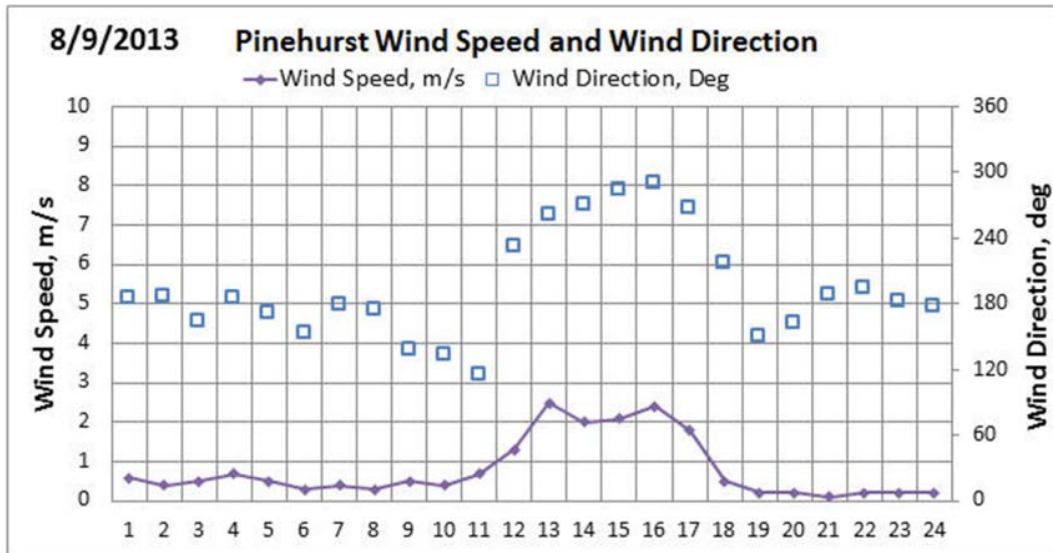
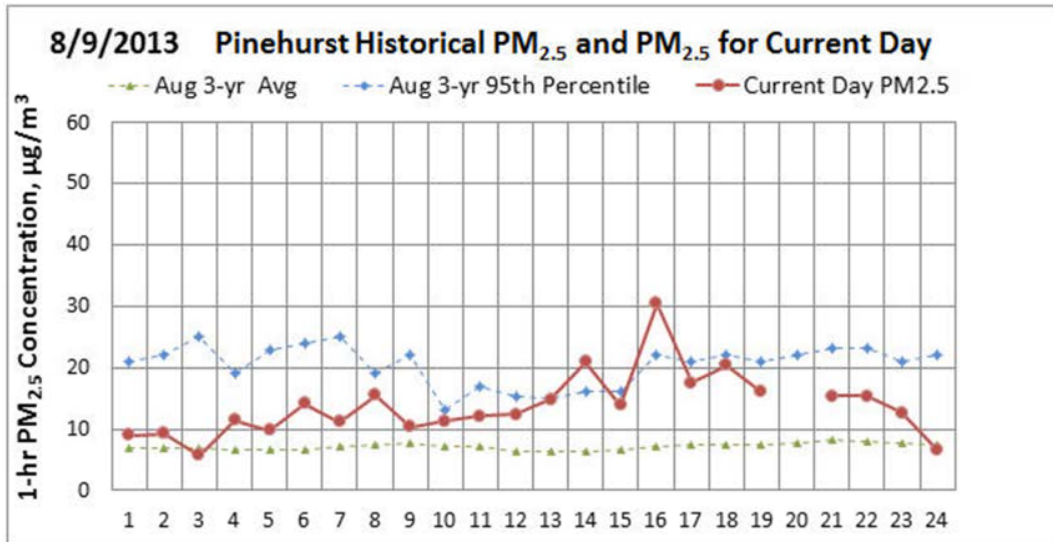




August 9, 2013

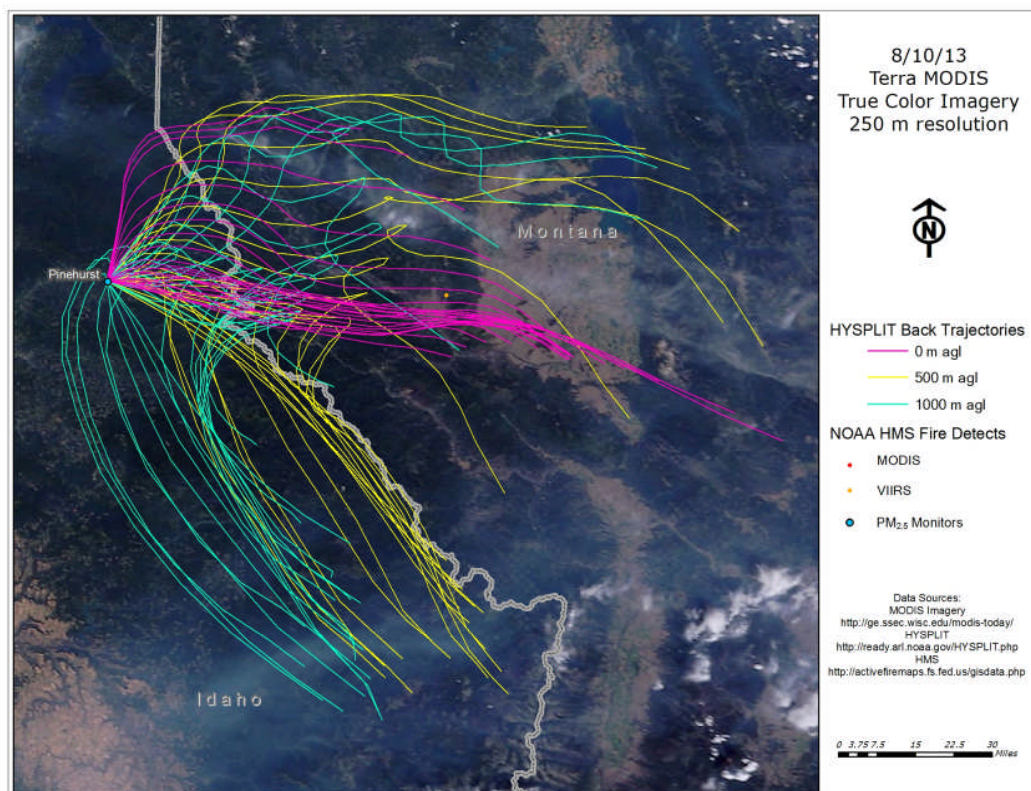
Summary of EER Evidence for Pinehurst Monitor Value, $13.7 \mu\text{g}/\text{m}^3$ on 8/9/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	While the upper-level pattern again remains the same, a thermal low develops at the surface in northeastern Oregon in conjunction with a surface high over Saskatchewan, which allows for easterly winds to develop off the northern Rockies.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	A moderately dense band of smoke stretches across Idaho and into Montana, to the south of Pinehurst. Back trajectories intersect the smoke. Hourly concentrations spike to $30 \mu\text{g}/\text{m}^3$ at 4 p.m.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $7 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

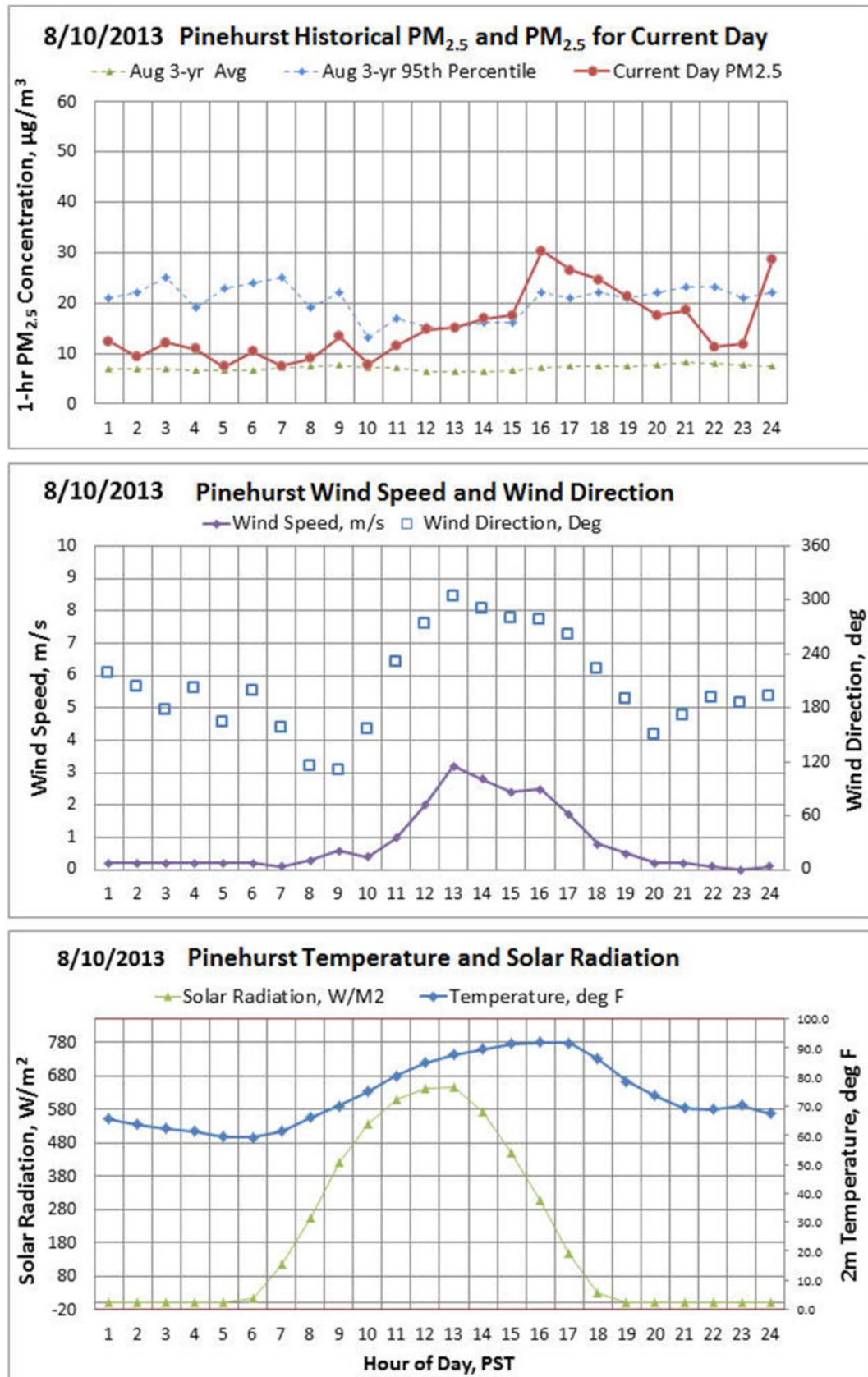




August 10, 2013

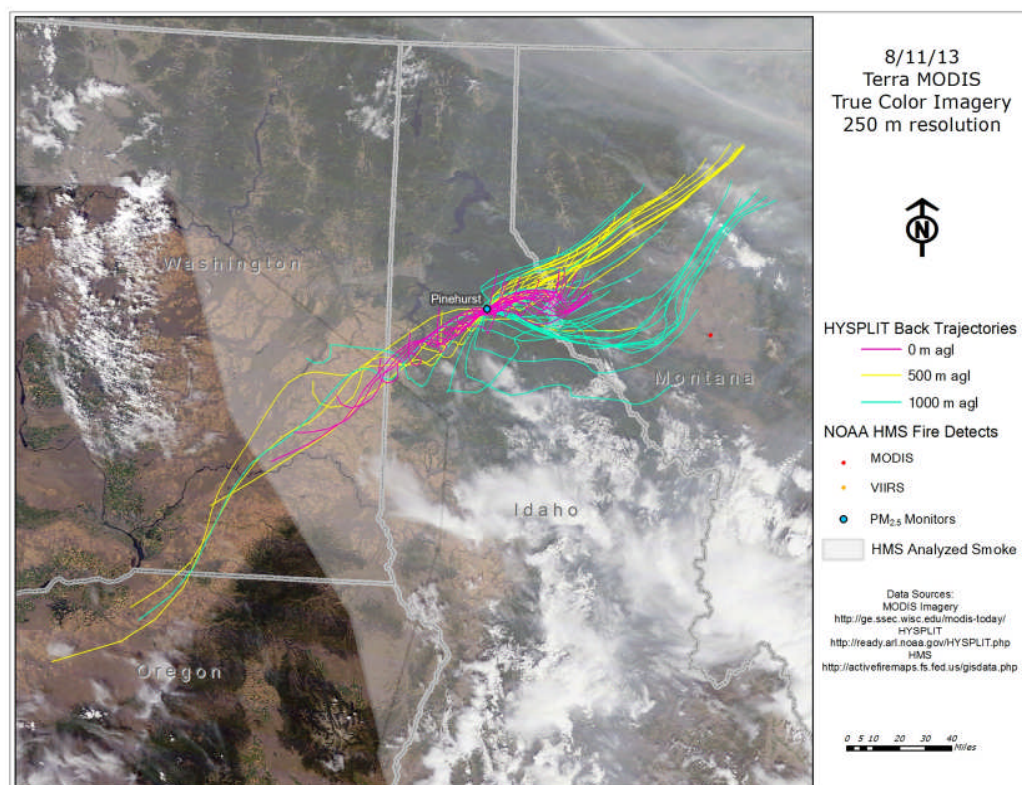
Summary of EER Evidence for Pinehurst Monitor Value, 15.2 $\mu\text{g}/\text{m}^3$ on 8/10/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	95th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Similar to previous day as conditions are driven by a weak surface pressure gradient that is oriented northeast to southwest. Upper-level conditions remain quite similar to previous days as the upper-level low tracks slowly to the east and subtle Rex block remains.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Visible smoke in ID and MT are intersected by back trajectories. Hourly concentrations increase in the afternoon, with values above the 95th percentile during 6 hours.
	Alternative Hypotheses	Evening temperature >60°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed 0.1–8.5 $\mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

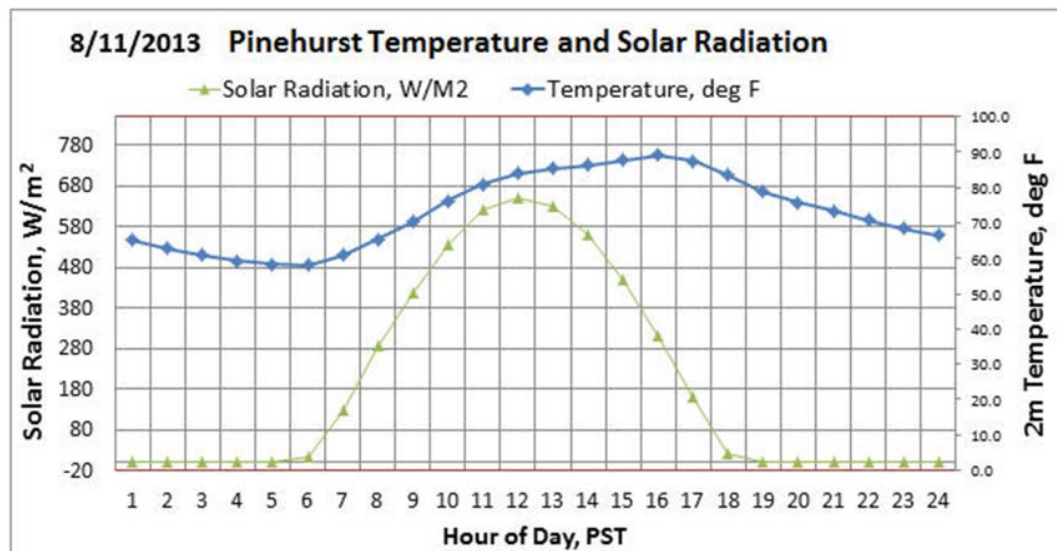
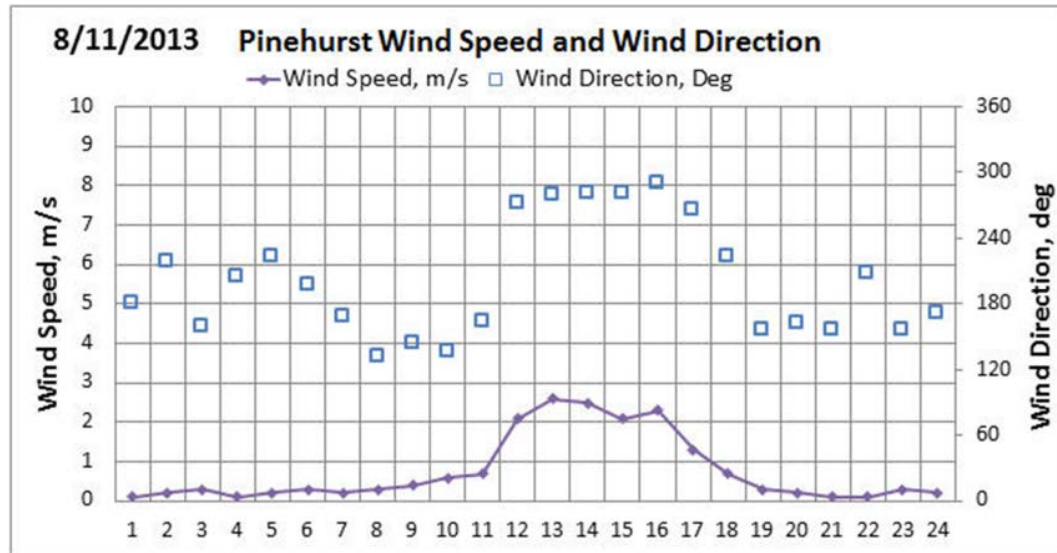
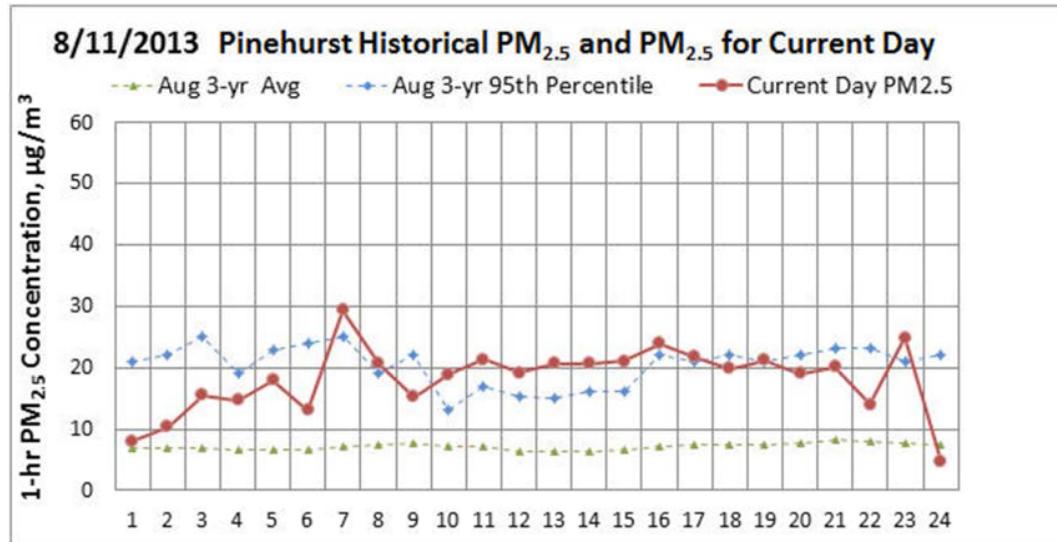




August 11, 2013

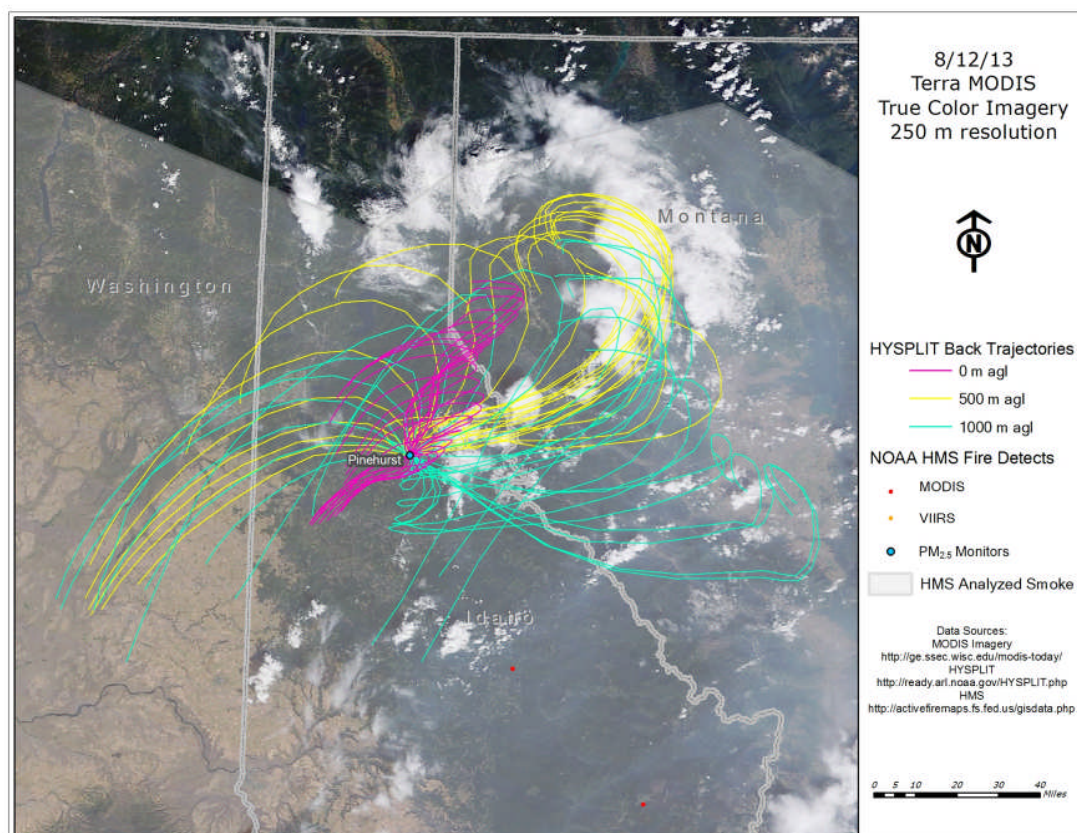
Summary of EER Evidence for Pinehurst Monitor Value, $18.1 \mu\text{g}/\text{m}^3$ on 8/11/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	97th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Local baroclinic troughs along southern British Columbia, eastern Washington, and southwestern Idaho account for an easterly surface pressure gradient that runs from northeast to southwest as the upper-level pattern again remains consistent with previous days. The cut-off low has yet to make landfall along the Oregon coast.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Thick plumes of smoke descend into MT from large wildfires burning in Canada. The tail ends of Pinehurst back trajectories intersect this smoke. Surface trajectories (pink) slosh east and west through the Silver Valley, recirculating local smoke. Hourly concentrations are relatively flat and are above the 95th percentile for 9 hours.
	Alternative Hypotheses	Evening temperature $>55^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed $3\text{--}11.4 \mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

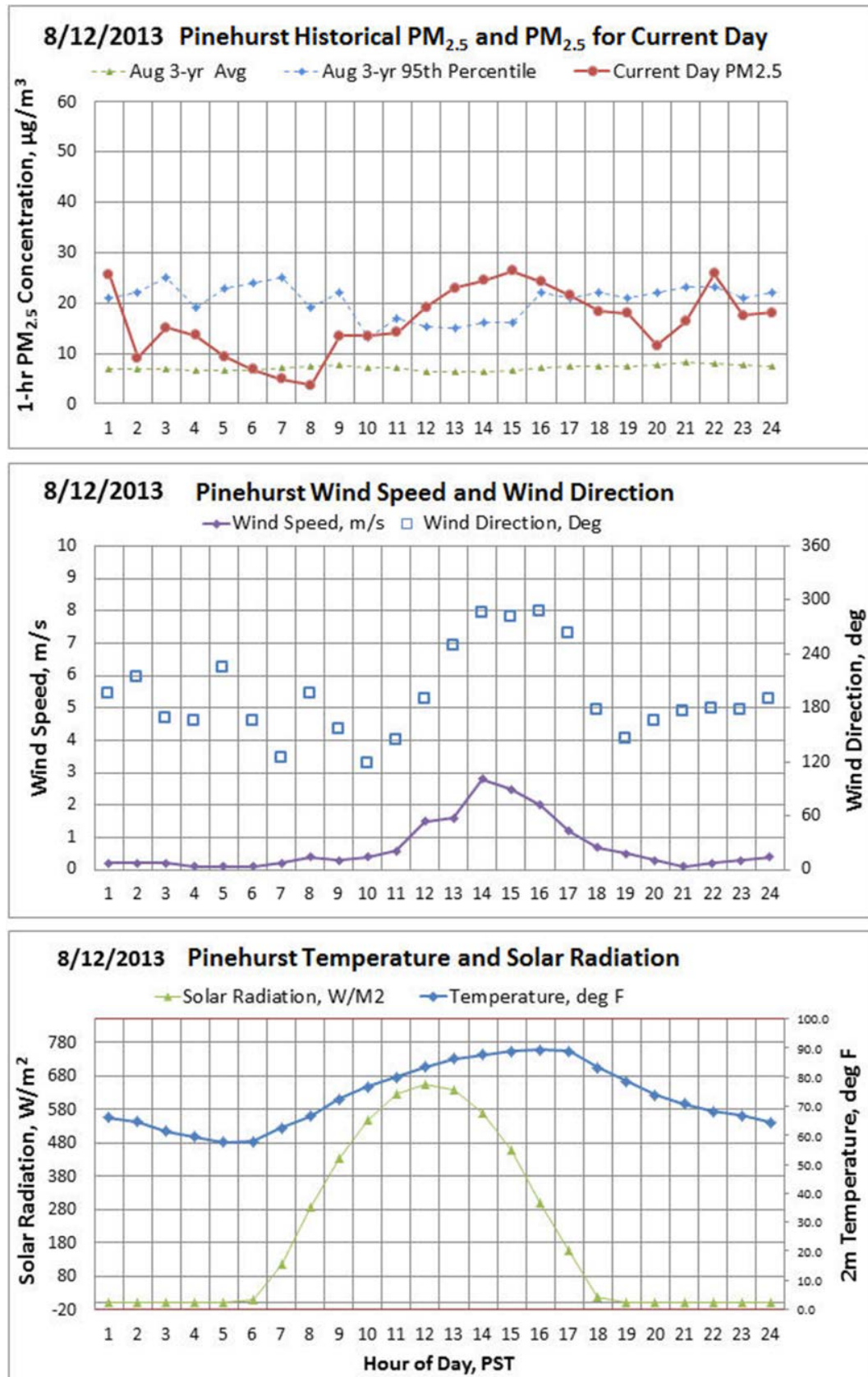




August 12, 2013

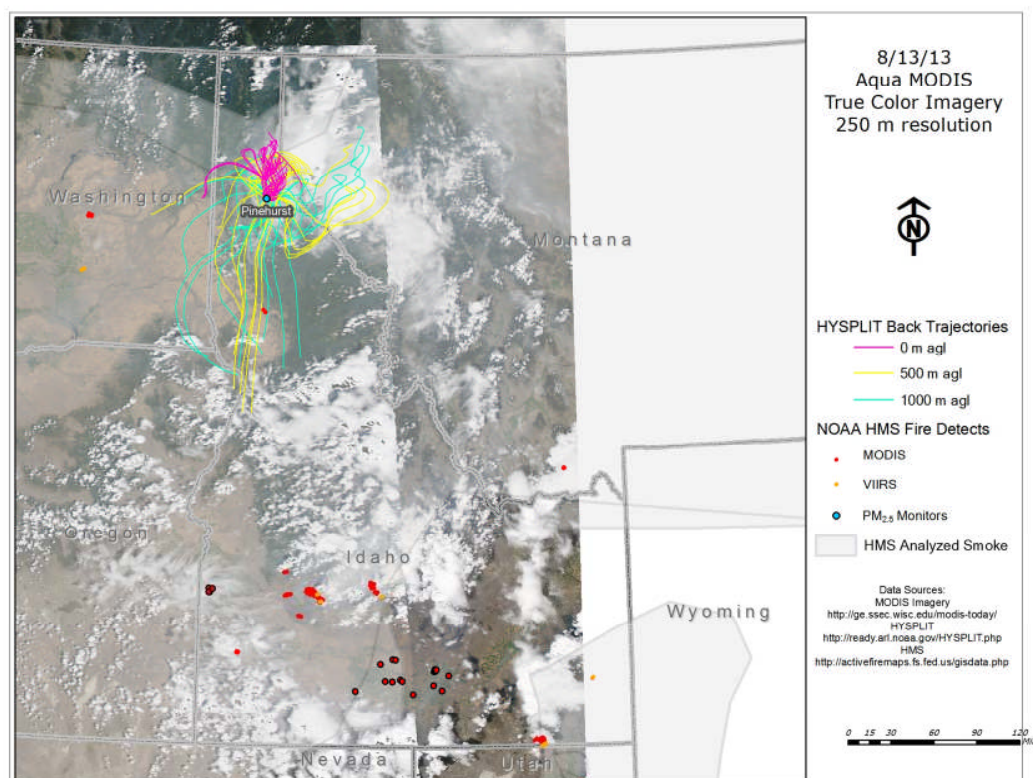
Summary of EER Evidence for Pinehurst Monitor Value, 16.4 $\mu\text{g}/\text{m}^3$ on 8/12/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	96th percentile seasonally (vs. 2004–2012) (Section 3).
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Upper-level pattern evolves into a strong Omega block spanning from Colorado to the Northwest Territories. Ridge axis is located along the Continental Divide with weak pressure gradients across the Pacific Northwest.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Smoke from MT and south of Pinehurst continues to recirculate into Pinehurst. Seven hours of this day have PM _{2.5} concentrations above the 95th percentile.
	Alternative Hypotheses	Evening temperature >55°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed 1.3–9.7 $\mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

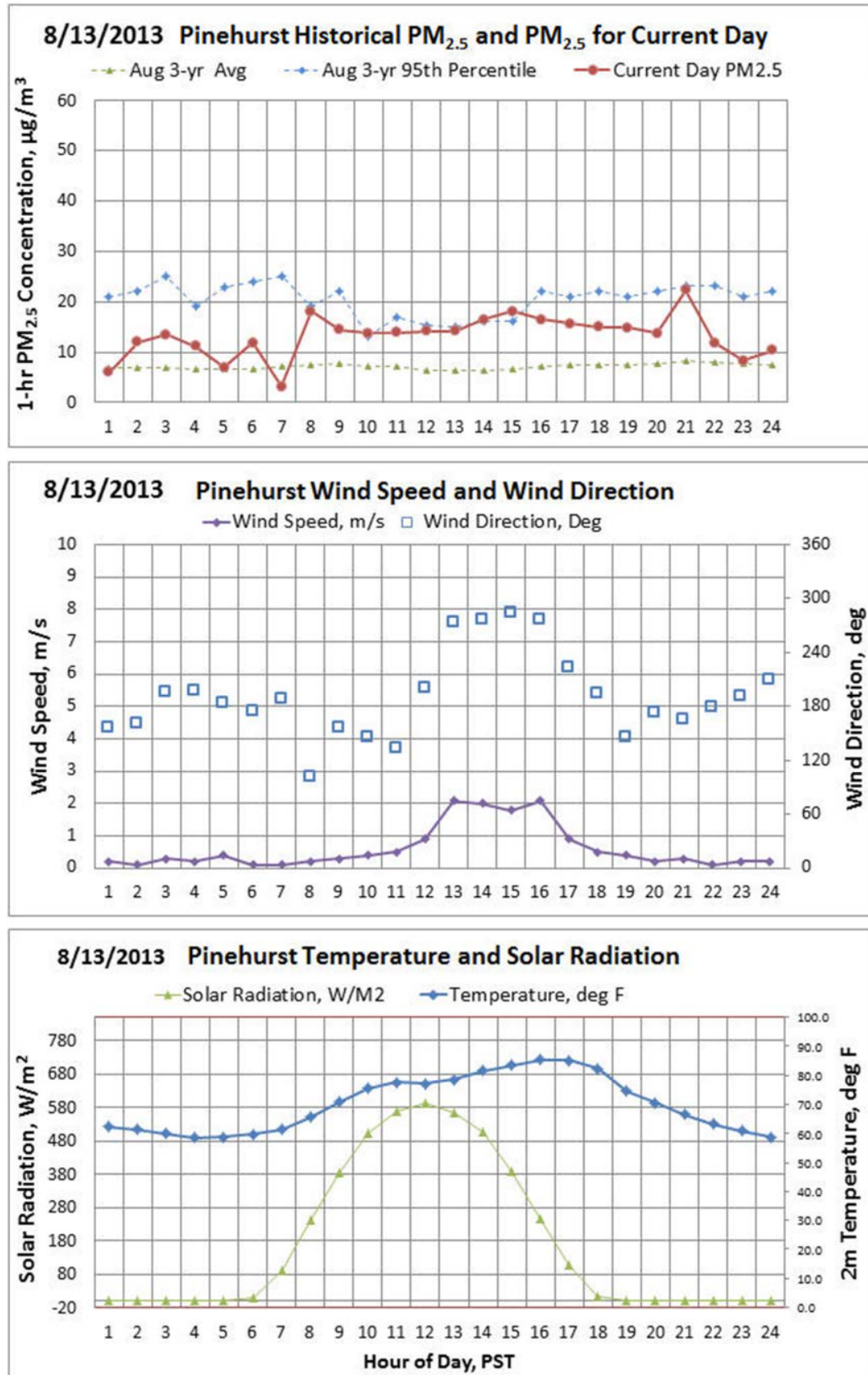




August 13, 2013

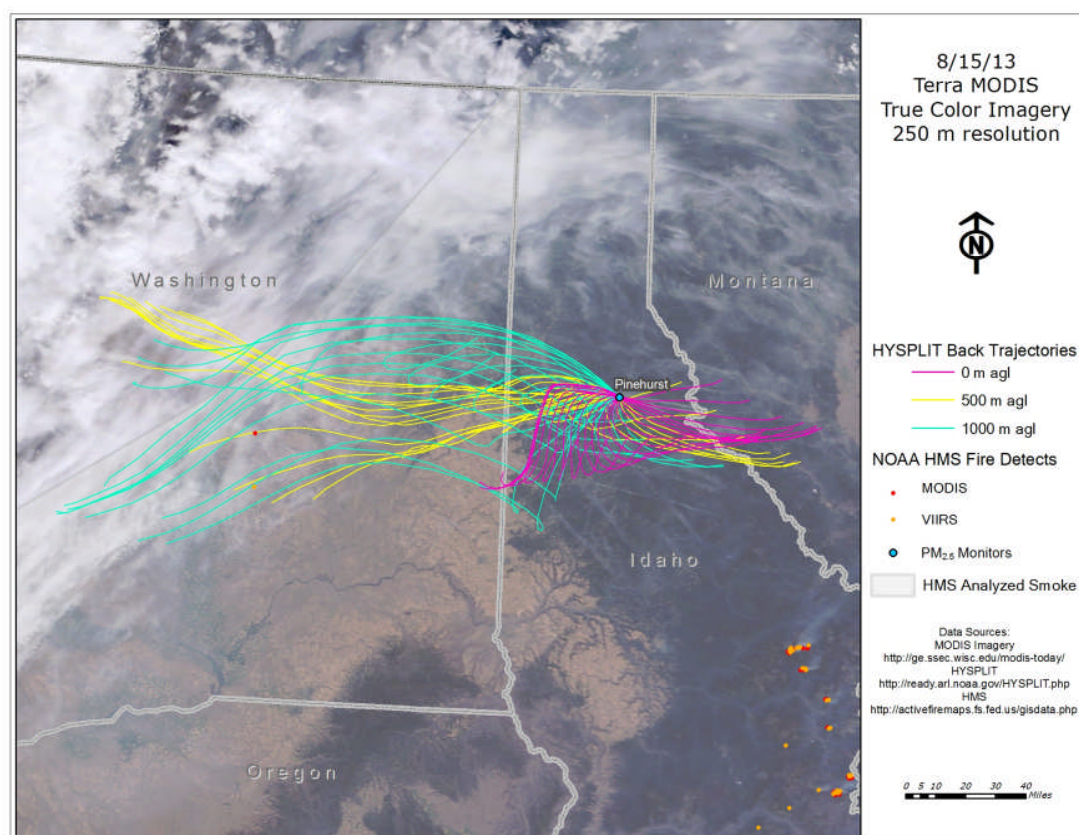
Summary of EER Evidence for Pinehurst Monitor Value, 13.1 $\mu\text{g}/\text{m}^3$ on 8/13/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	A secondary upper-level low-pressure system suppresses the Omega block to near the US/Canada border. Ridge characteristics exist and dominate over northern Idaho. Thermal low near Spokane creates complexity to local wind directions.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Stagnant conditions continue with low wind speeds and confused directions, as indicated by back trajectory pattern. Light smoke is identified by HMS throughout the region. Hourly trace show elevation above historical average but not above the 95th percentile.
	Alternative Hypotheses	Evening temperature >55°F, so RWC is likely limited (Section 4.3). CRB activity confined to southern Idaho, too far away to affect Pinehurst (field burns identified by red circles with black outlines on map).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6.4 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

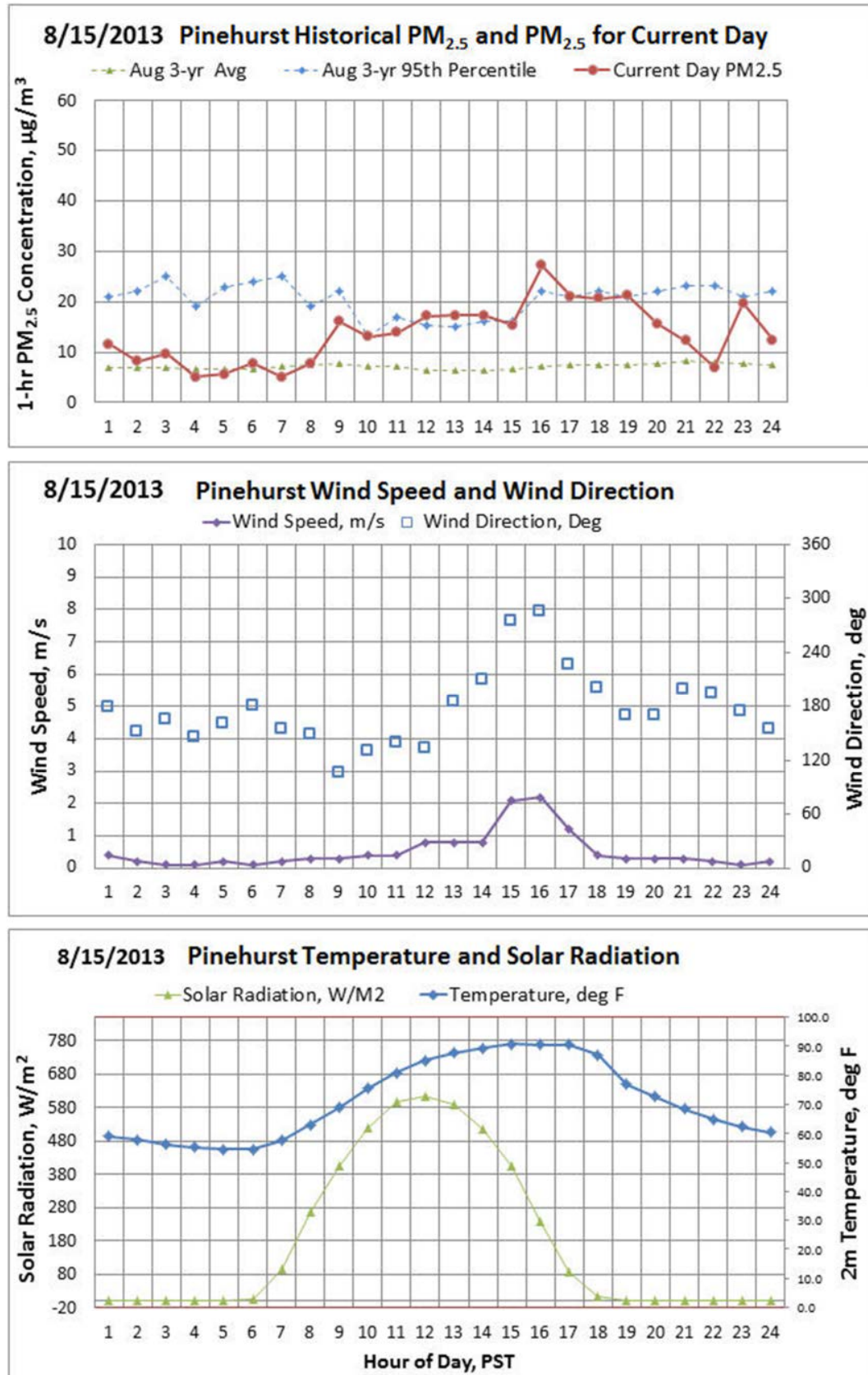




August 15, 2013

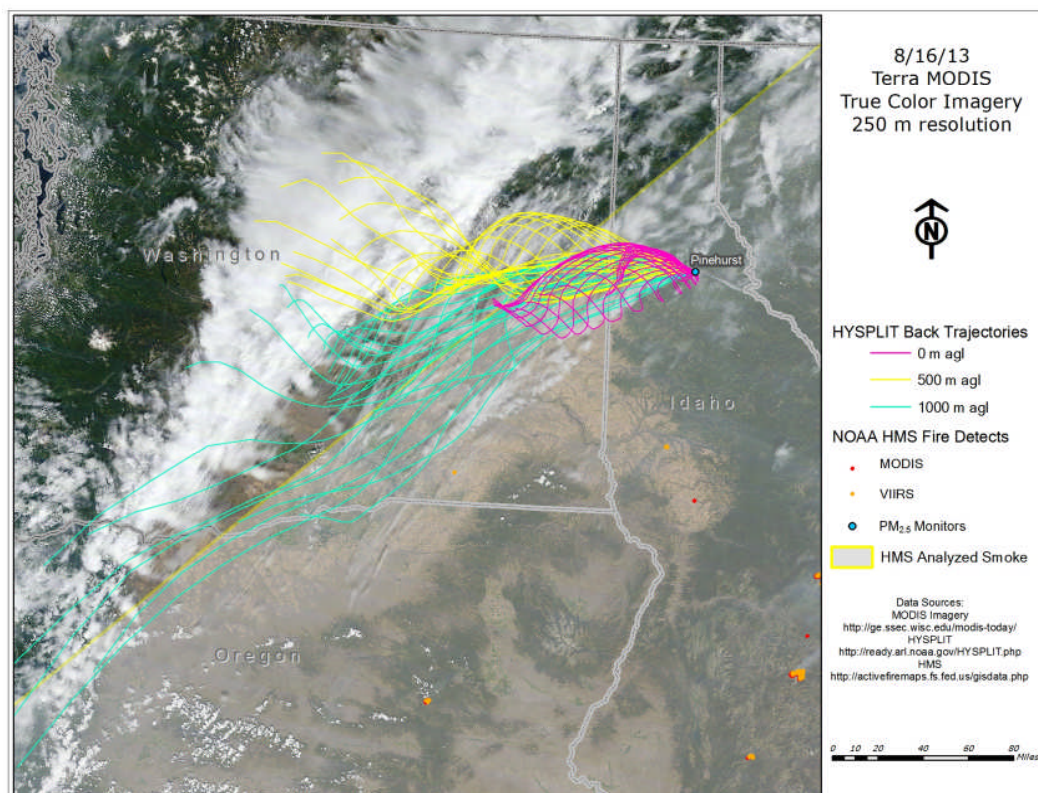
Summary of EER Evidence for Pinehurst Monitor Value, 13.6 $\mu\text{g}/\text{m}^3$ on 8/15/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Upper-level Omega block is being suppressed by approaching upper-level low-pressure system over Haida Gwaii. A thermal low develops over eastern Washington again resulting in complex surface wind direction patterns.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Contrails and clouds occupy the Pinehurst area. Numerous fire detects are visible south of Pinehurst and smoke clearly occupies river drainages, but back trajectories do not intersect these sources. Five hourly concentrations are above the 95th percentile for the day.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6.9 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

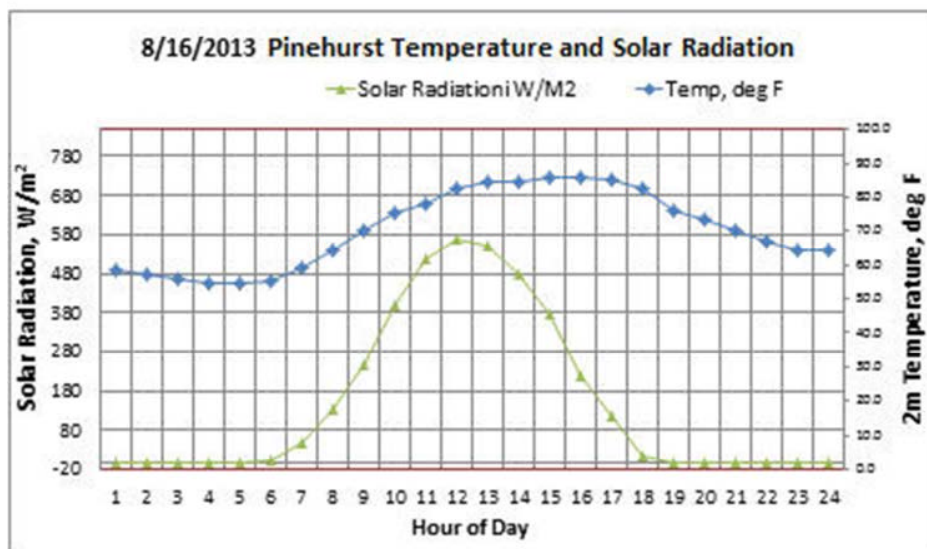
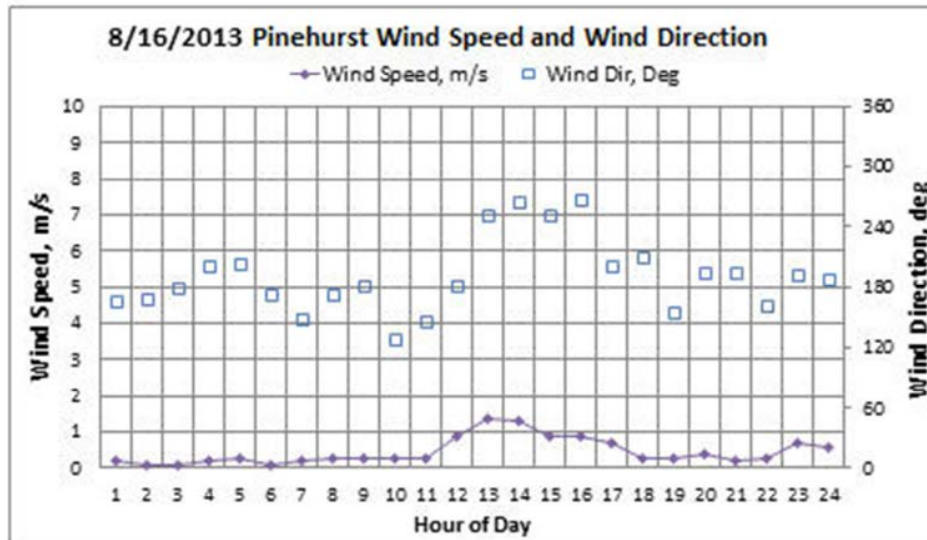
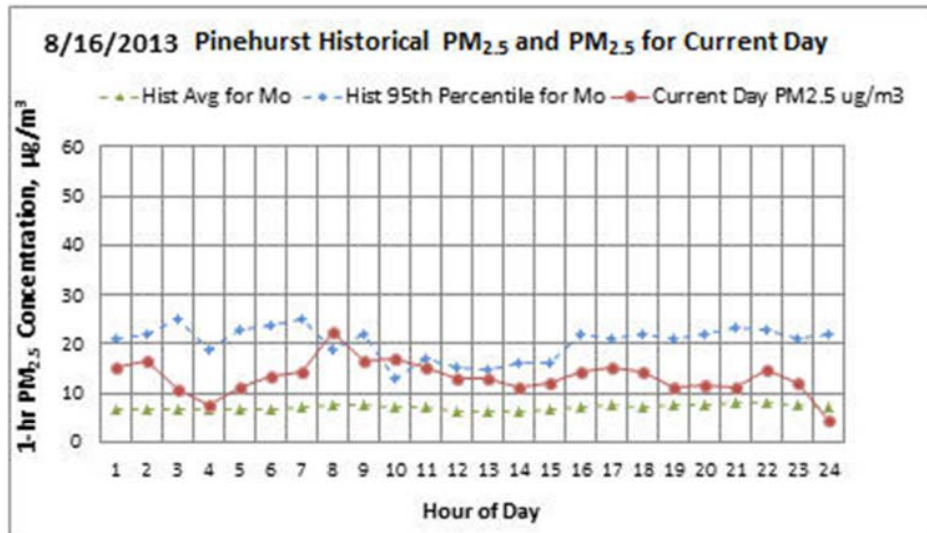




August 16, 2013

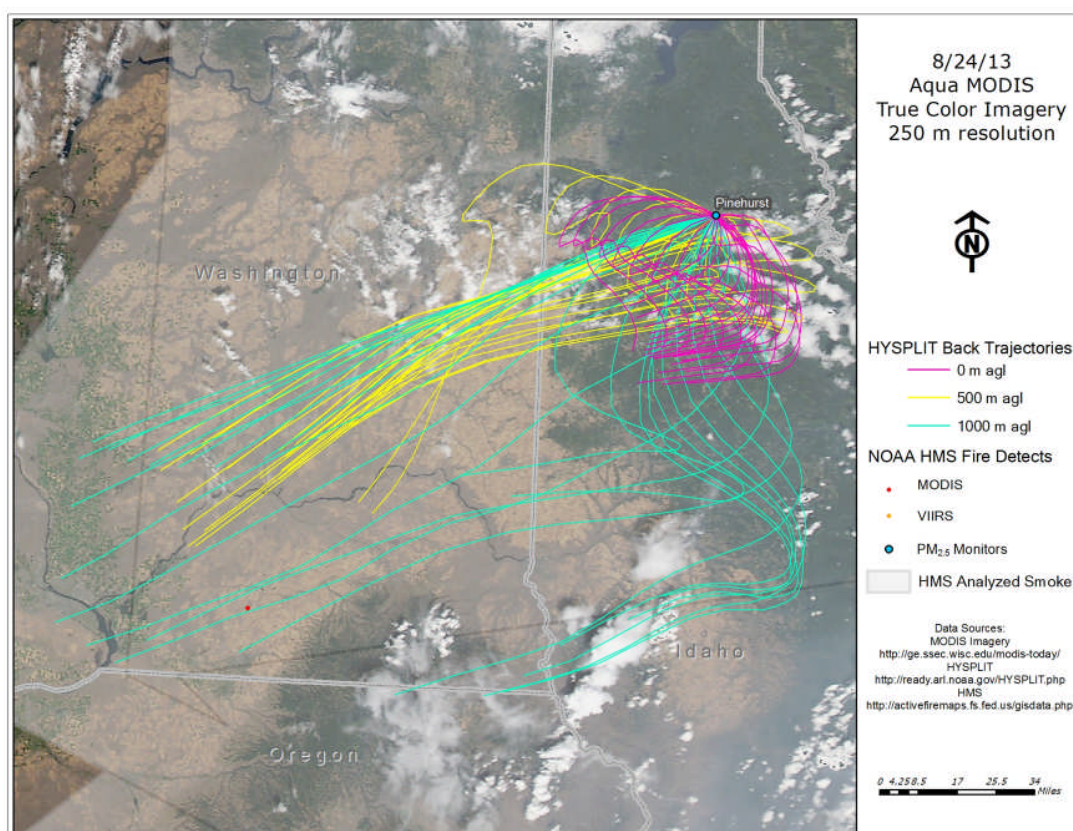
Summary of EER Evidence for Pinehurst Monitor Value, $13.3 \mu\text{g}/\text{m}^3$ on 8/16/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Northern Idaho is situated under a suppressed ridge pattern as an upper-level low-pressure system approaches Vancouver Island. At the surface, weak pressure gradients found across the entire Pacific Northwest to the Continental Divide with a stationary front located from Boise to Missoula.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Contiguous with wildfire EE-flagged days. Smoke visible on MODIS imagery and HMS analyzed smoke; all hours but one above historical average. Back trajectories modeled using EDAS 40 km met data; NAM 12 km met data unavailable on this day.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $6.6 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

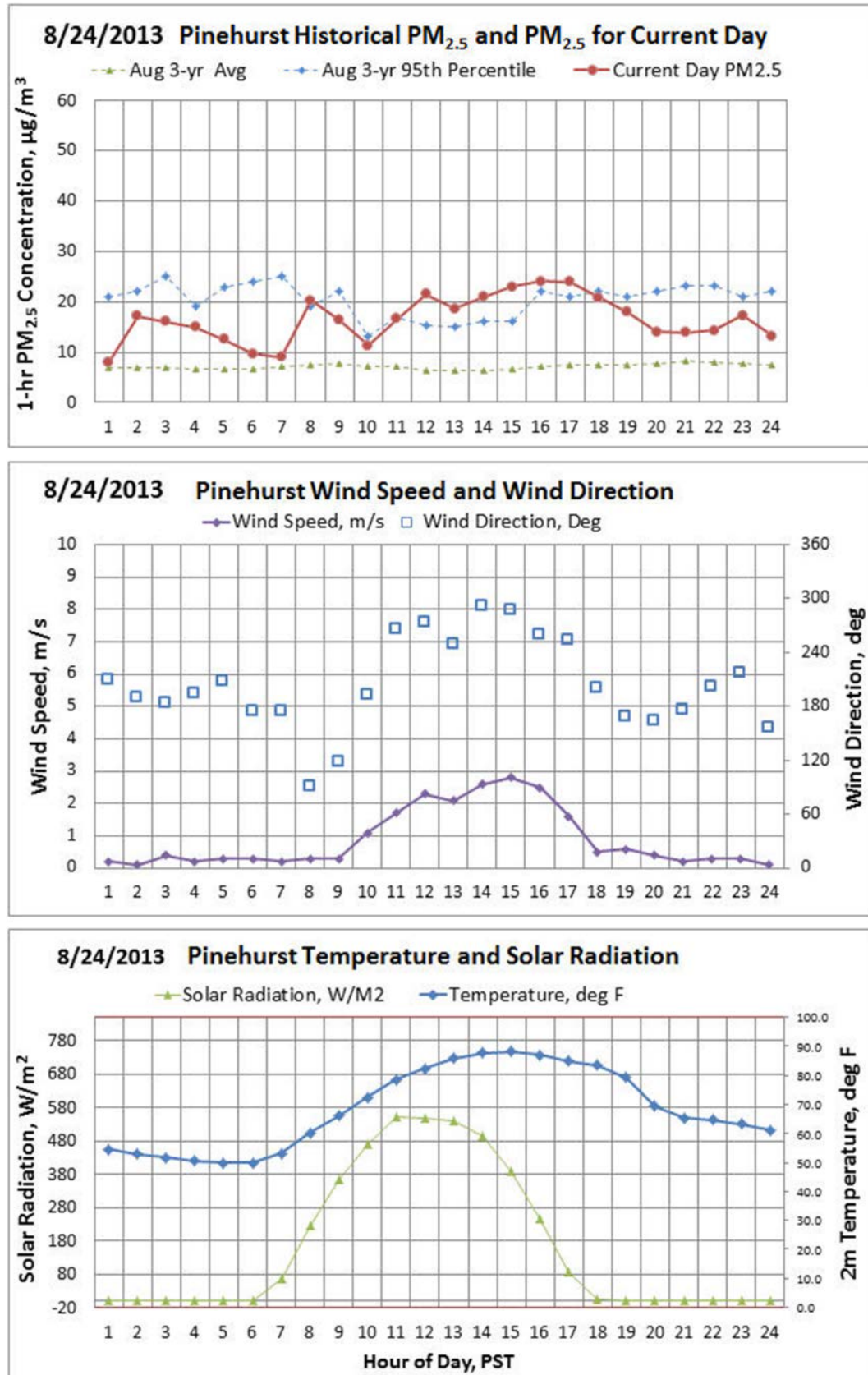




August 24, 2013

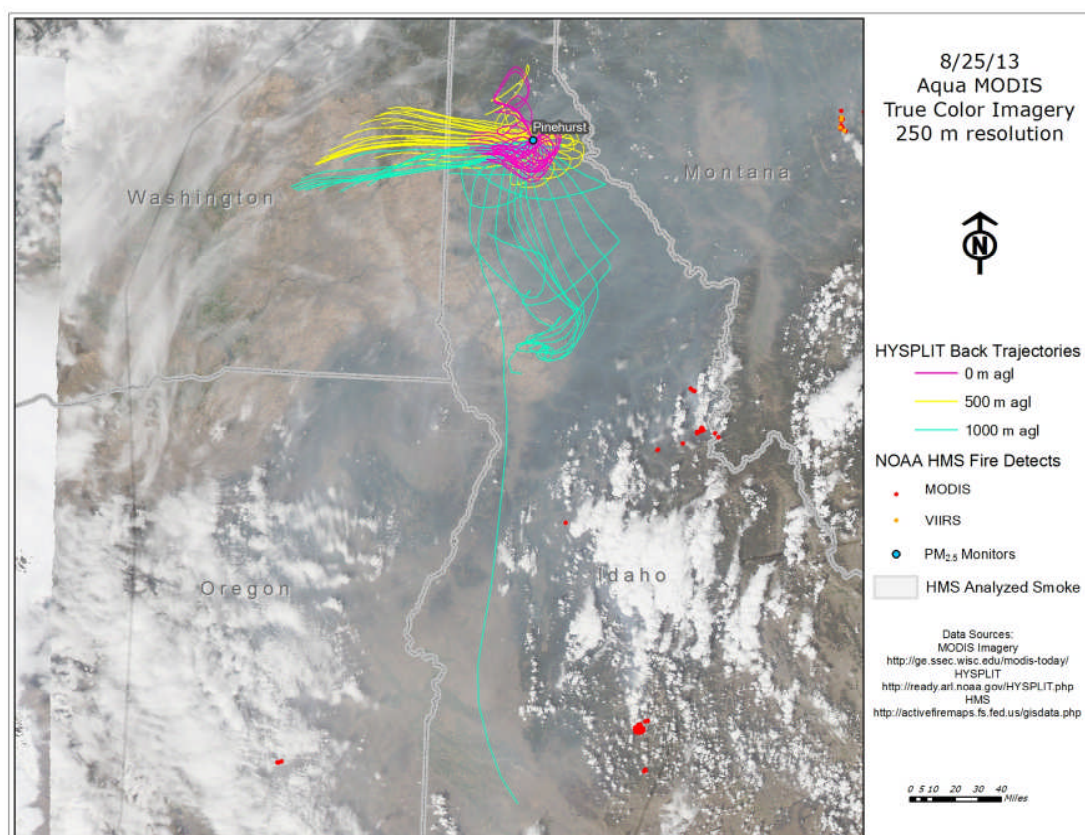
Summary of EER Evidence for Pinehurst Monitor Value, $16.4 \mu\text{g}/\text{m}^3$ on 8/24/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	96th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	Northern Idaho is situated under a suppressed ridge pattern as an upper-level low-pressure system approaches Vancouver Island. At the surface, weak pressure gradients found across the entire Pacific Northwest to the Continental Divide.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Smoke creeps north from fires in central ID and back trajectories intersect patches. Hourly concentrations rise above the 95th percentile for 6 hours after noon.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed $1.3\text{--}9.7 \mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

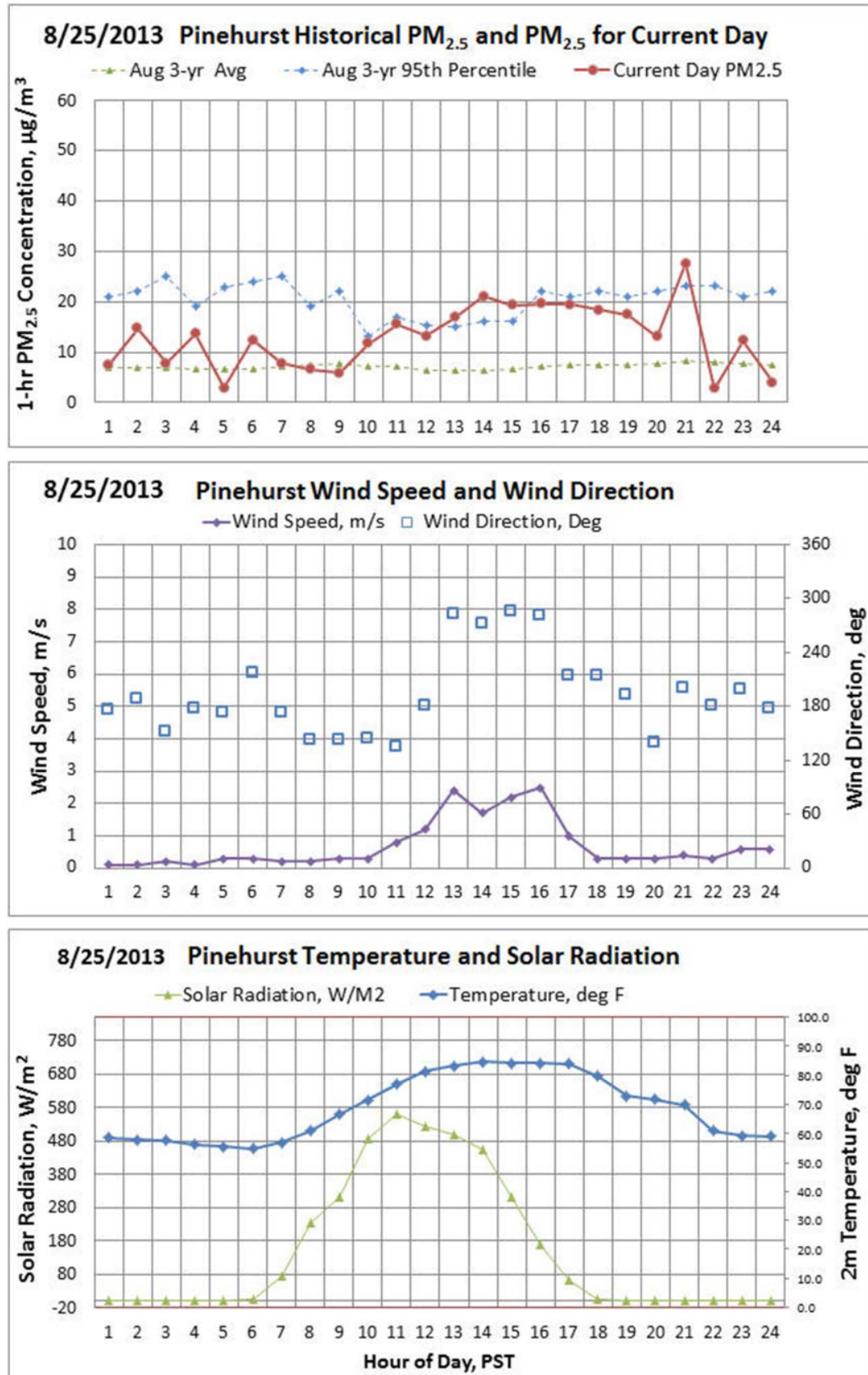




August 25, 2013

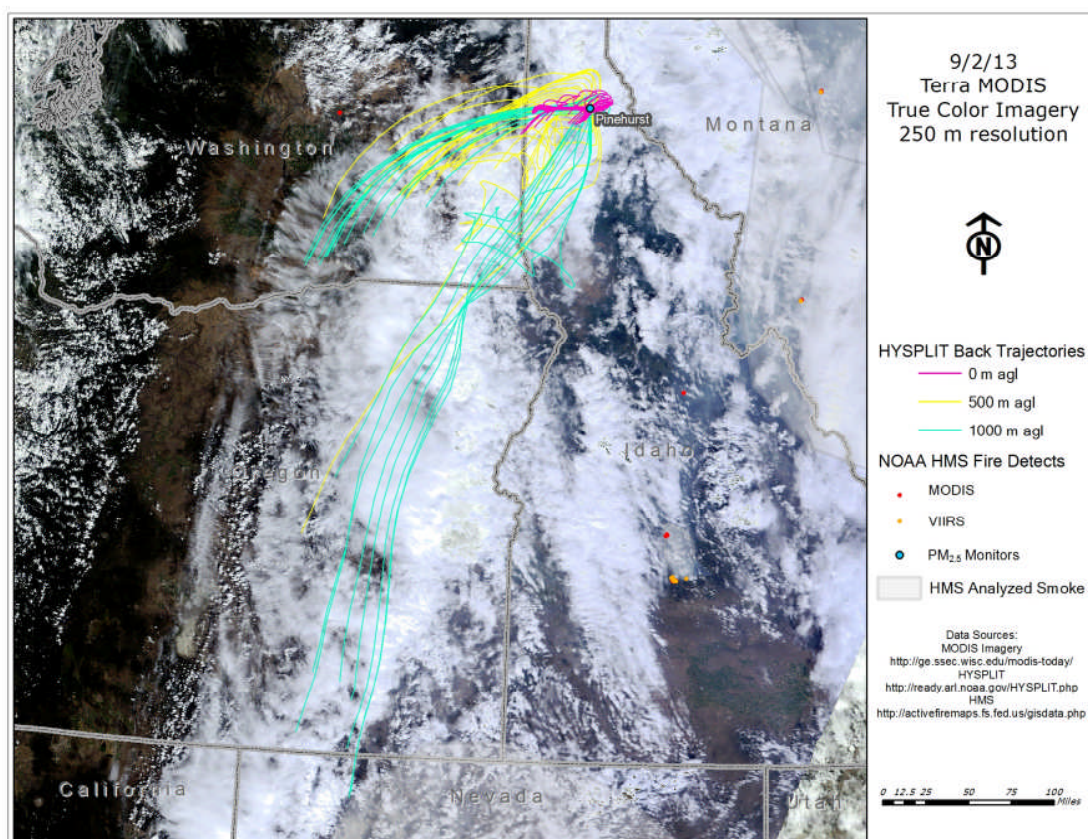
Summary of EER Evidence for Pinehurst Monitor Value, 12.9 $\mu\text{g}/\text{m}^3$ on 8/25/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	The upper-level ridge pattern intensifies this day as the upper-level low-pressure system drops south to California. A stationary front bisects Idaho along a line running from Boise to Wallace at the surface.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Stagnant conditions are indicated again by short back trajectories. A large interstate plume originating at the Rim fire in CA crosses ID from southwest to northeast, covering Pinehurst in wildfire smoke.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6.2 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

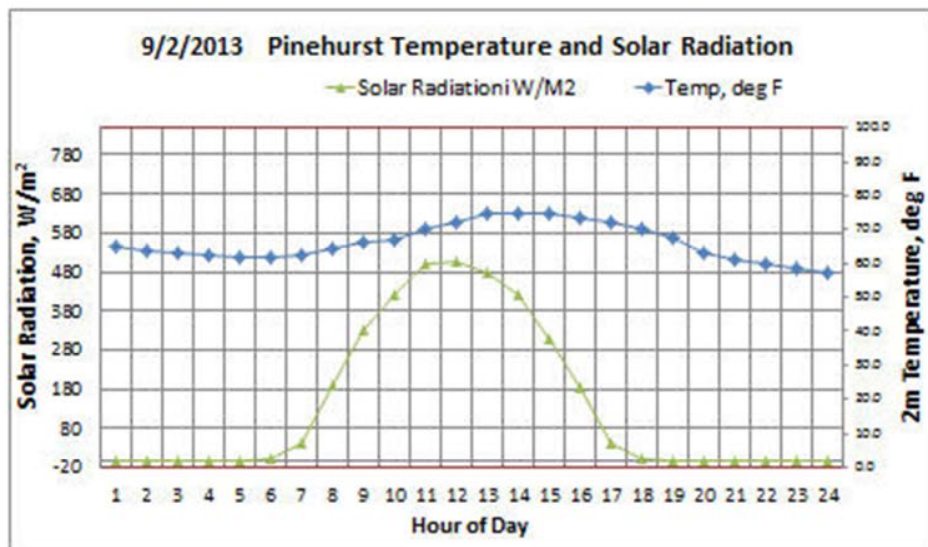
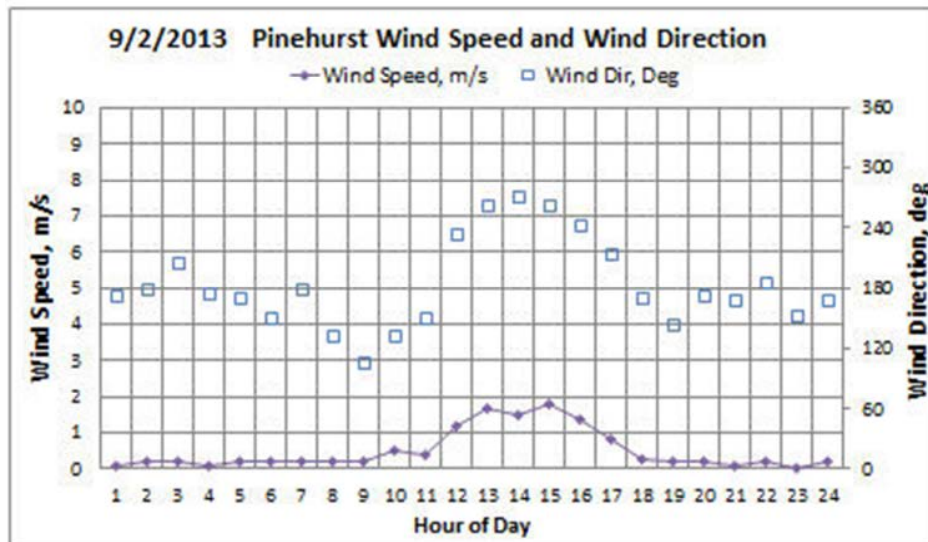
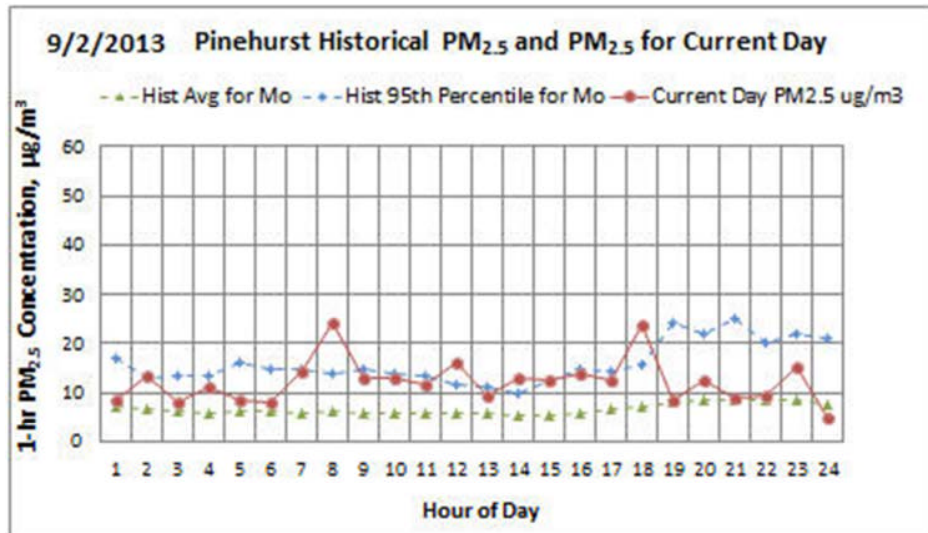




September 2, 2013

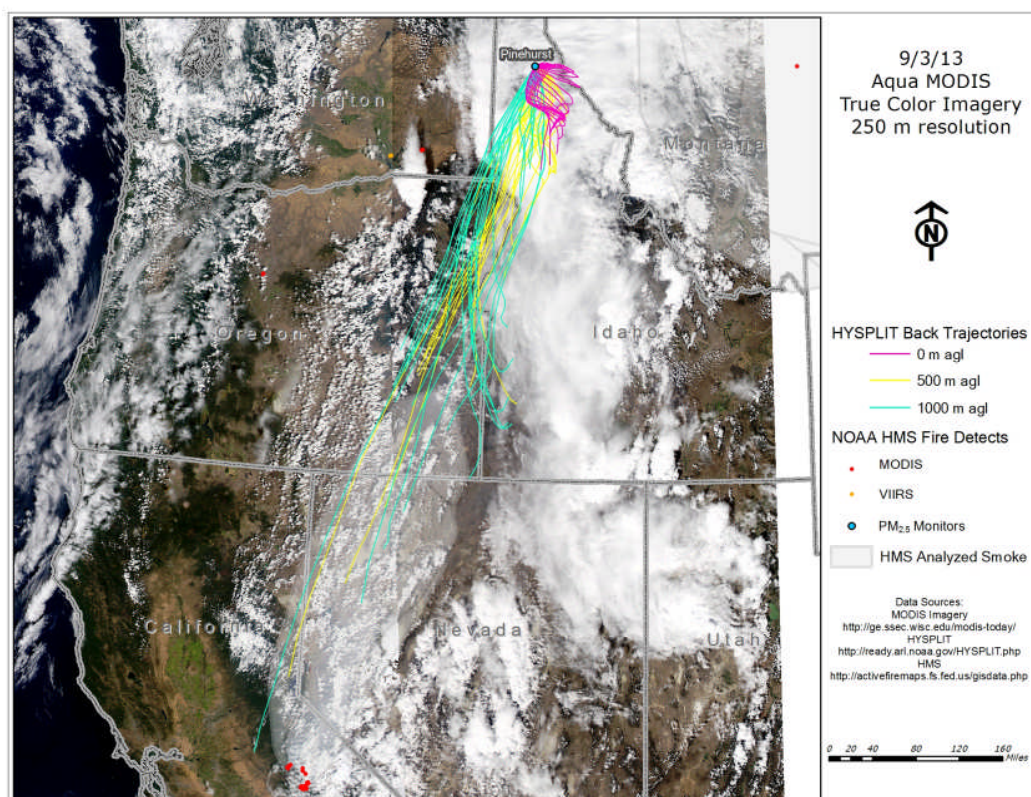
Summary of EER Evidence for Pinehurst Monitor Value, 12.2 $\mu\text{g}/\text{m}^3$ on 9/2/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	93rd percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Northern Idaho is under the backside of an upper-level ridge with a mature upper-level low-pressure system off the Washington coast providing southerly steering flow. This provides moisture for cloud development as well as smoke advection.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Low value and cloudy, but smoke is clearly evident on MODIS imagery and HMS analyzed smoke product. Time series indicates all hours above historical average and 3 above 95th percentile, but no large peak and no back trajectory evidence. No alternative sources since prescribed and CRB burning are shut down.
	Alternative Hypotheses	Evening temperature >55°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 5.5 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

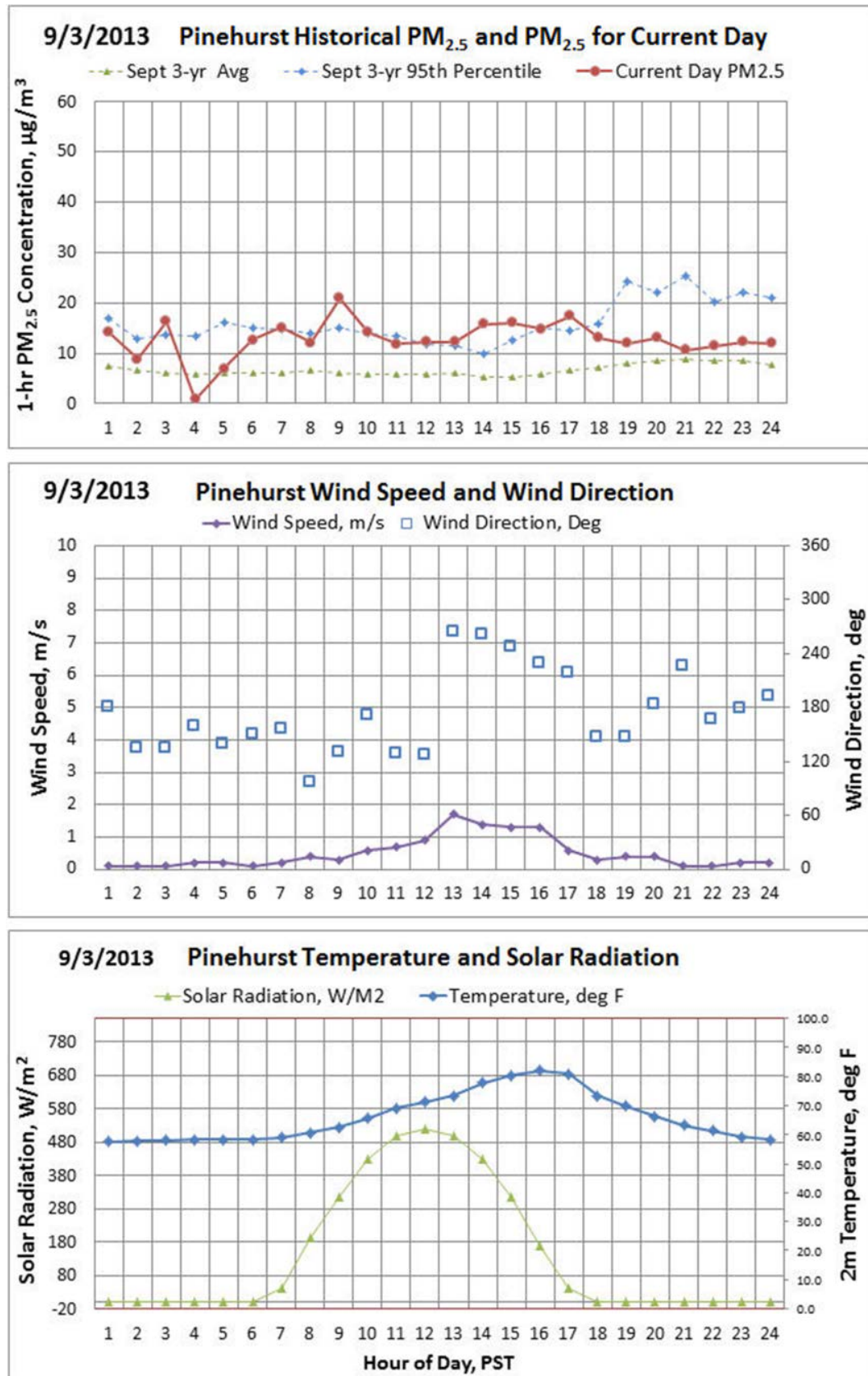




September 3, 2013

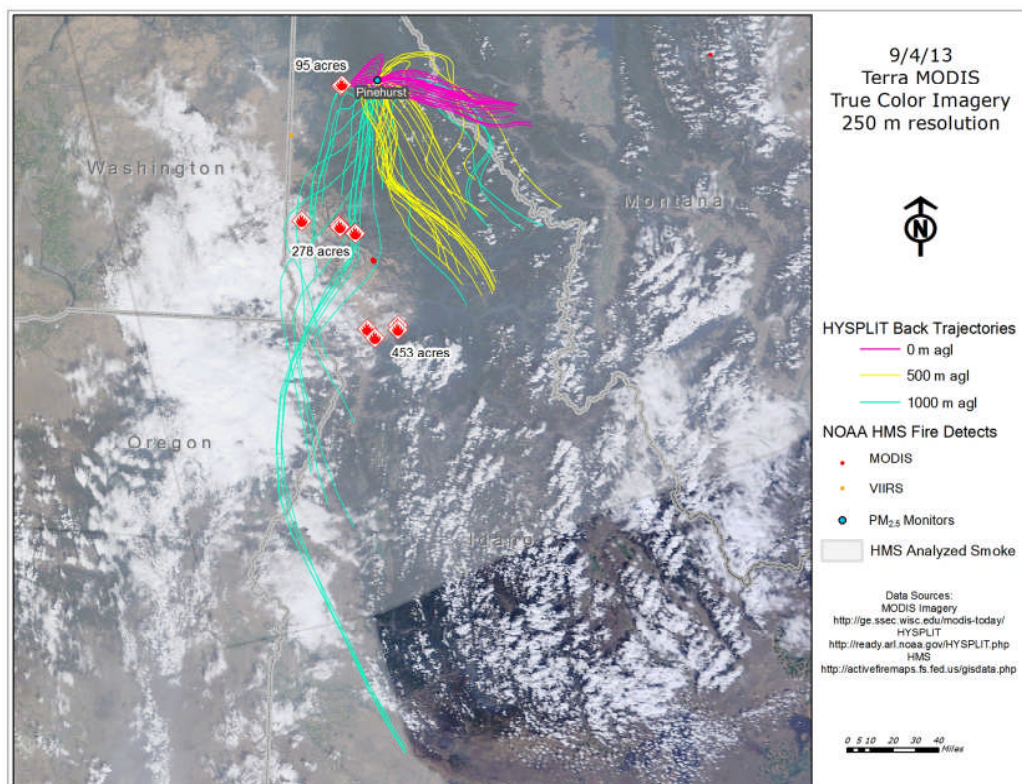
Summary of EER Evidence for Pinehurst Monitor Value, 12.7 $\mu\text{g}/\text{m}^3$ on 9/3/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	93rd percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	Northern Idaho is under the backside of an upper-level ridge with a strong upper-level low-pressure system off the Washington coast providing southerly steering flow. This provides moisture for cloud development as well as smoke advection.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	The Pinehurst region is cloudy but the high back trajectories bring in the substantial smoke being produced by the Rim fire in northern CA. Six hourly PM _{2.5} concentrations are above the 95th percentile.
	Alternative Hypotheses	Evening temperature >55°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

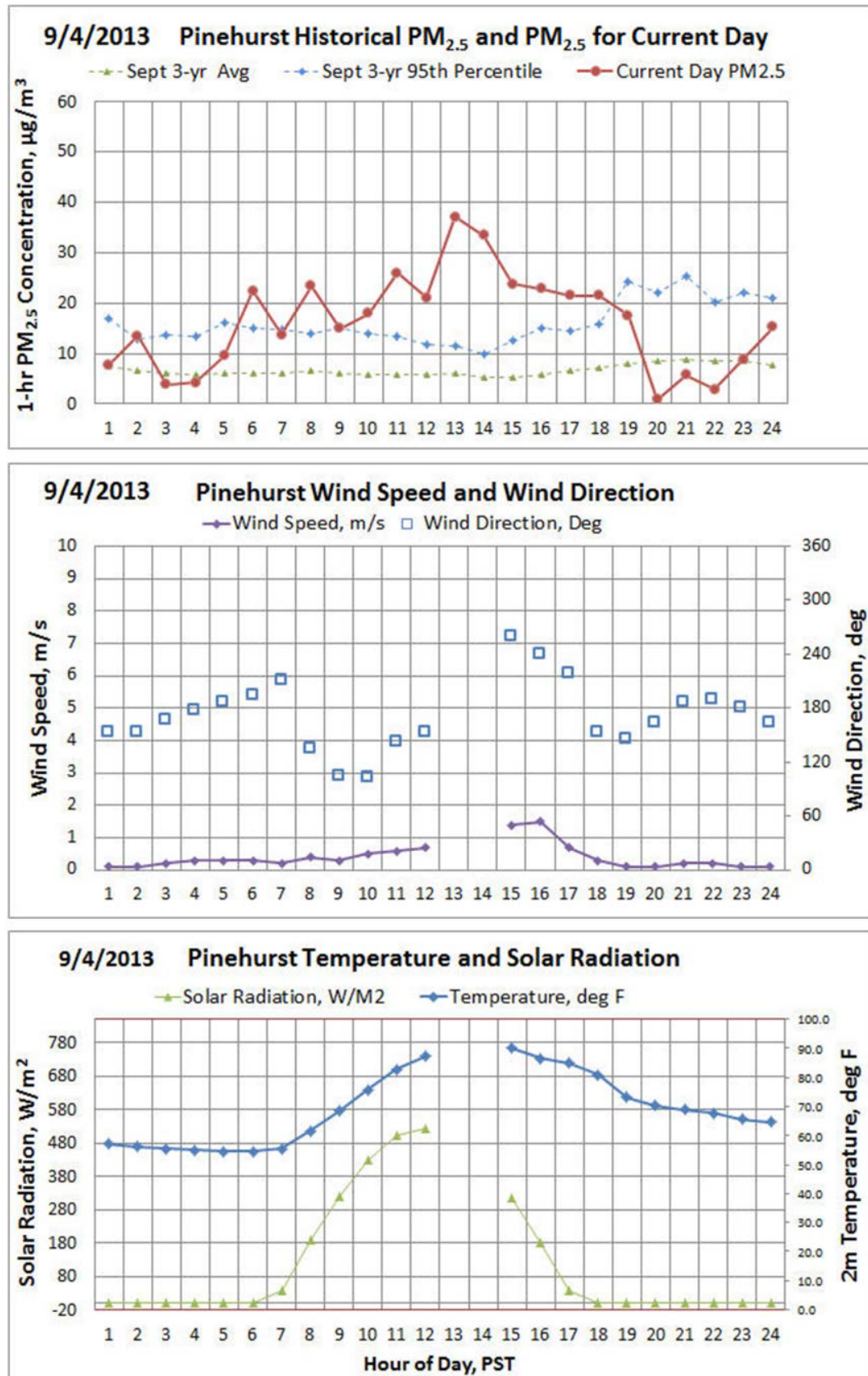




September 4, 2013

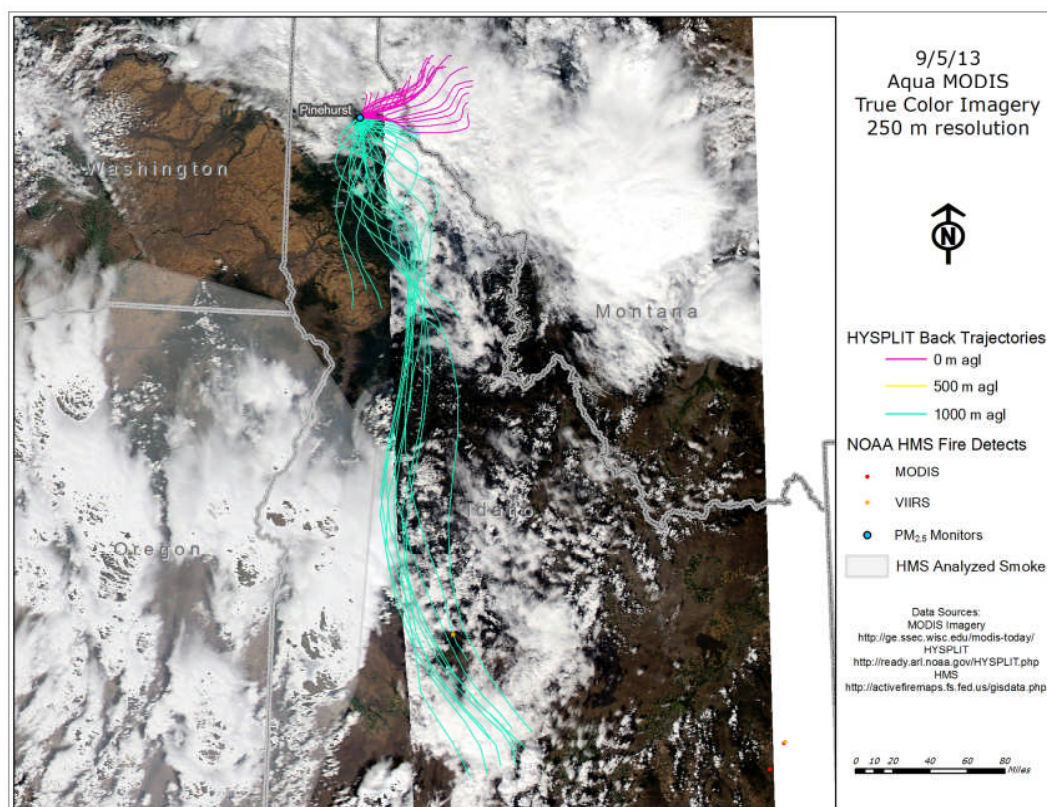
Summary of EER Evidence for Pinehurst Monitor Value, $16.2 \mu\text{g}/\text{m}^3$ on 9/4/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	96th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1, 2 (Section 4)
	Weather Conditions	The upper-level low continues to drop south, which enhances the southerly component of the steering winds into Idaho to nearly due south. The Four Corners high continues to support an upper-level ridge over Idaho.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Southerly winds continue to bring the Rim fire smoke to Pinehurst on the high trajectories. Surface trajectories indicate recirculation of local air. $\text{PM}_{2.5}$ concentrations are elevated for much of the day, peaking at $38 \mu\text{g}/\text{m}^3$.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3). CRB activity intersects back trajectories (see Supplemental Materials for 9/4/2013, Appendix E).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed $1.1\text{--}9.5 \mu\text{g}/\text{m}^3$. These values are suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

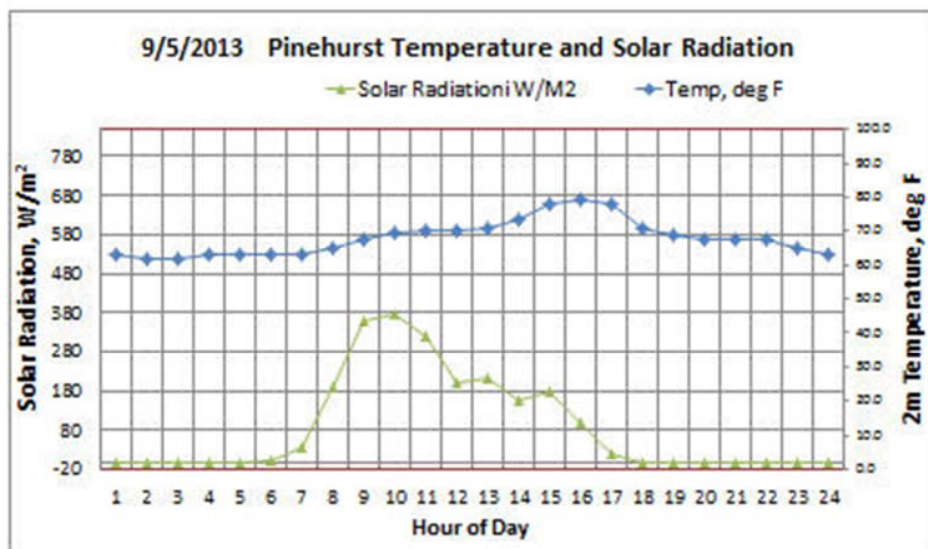
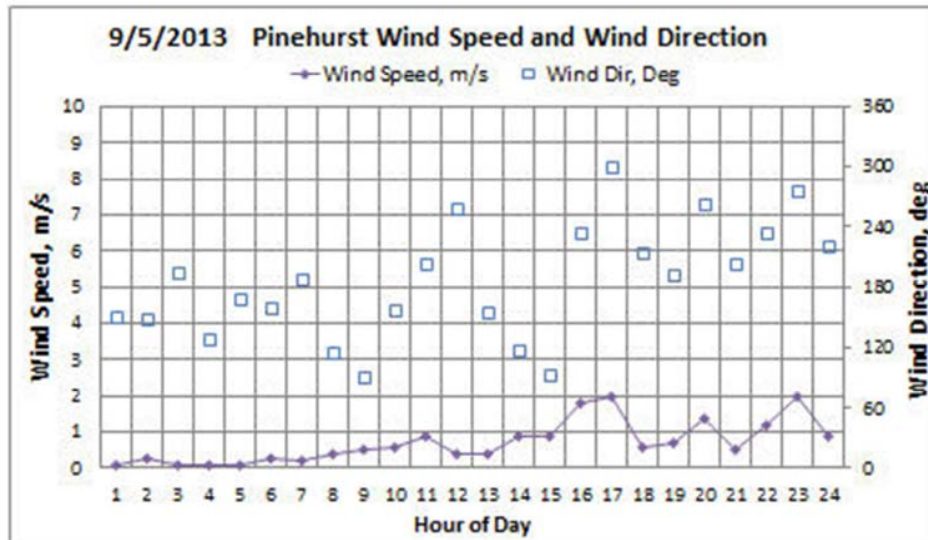
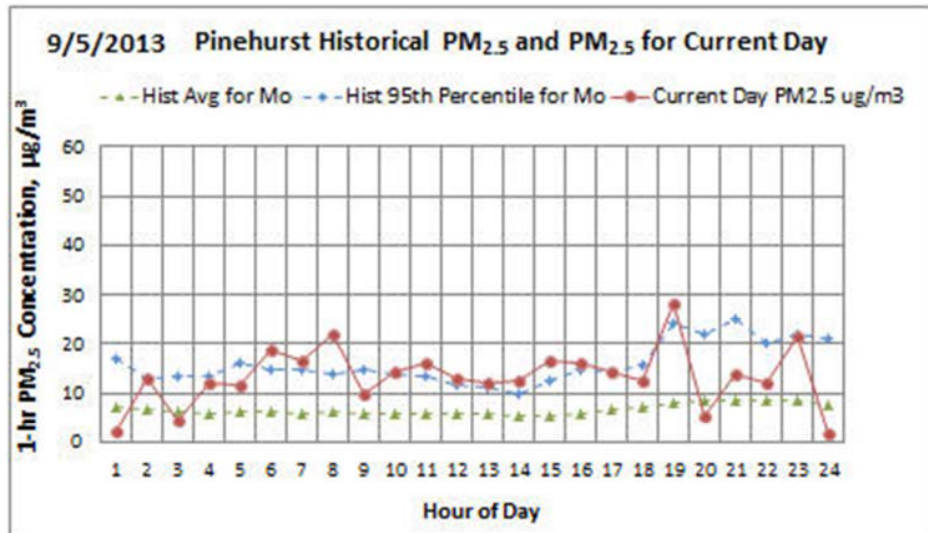




September 5, 2013

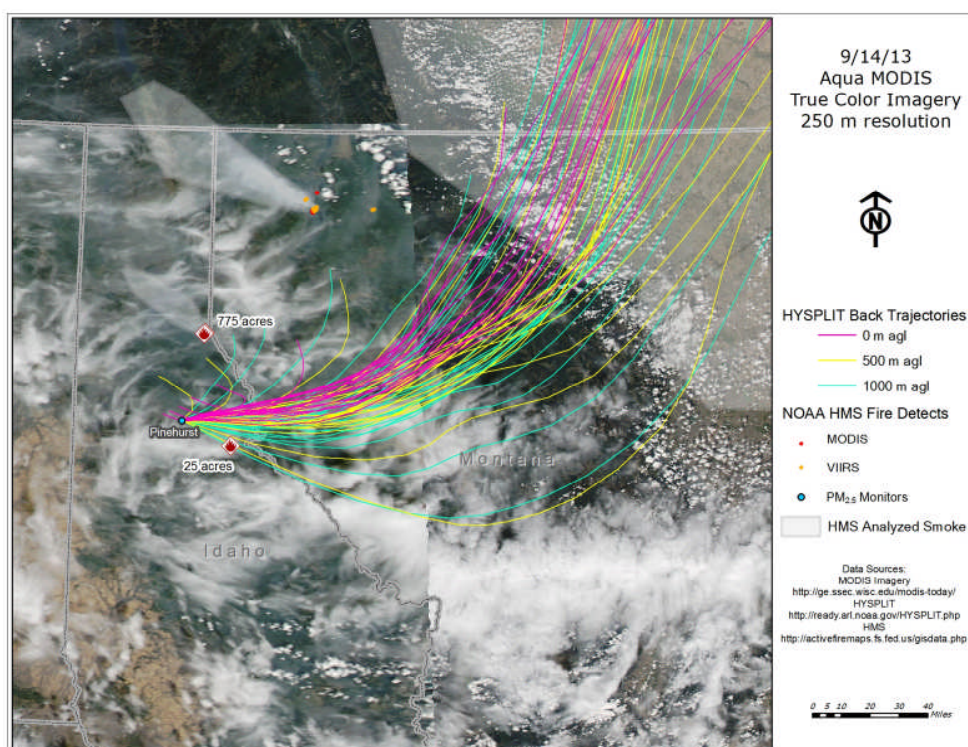
Summary of EER Evidence for Pinehurst Monitor Value, 13.4 $\mu\text{g}/\text{m}^3$ on 9/5/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	94th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	The upper-level cut-off low blocking pattern located over British Columbia and the Pacific Coast to the Oregon border as the Four Corners high shifts slightly to the north and east support southerly transport of Canadian fires and limited zonal movement of the atmosphere over Idaho.
	Transport Conditions, PM _{2.5} , and wind information. See satellite image with back trajectories and time series.	Cloudy, but contiguous with wildfire caused, EE-flagged day on September 4 caused by Rim fire in Northern California. HMS analyzed smoke and HMS smoke text product indicates smoke in region of northern Idaho. Most hours above historical average for August and 10 hours at or above 95th percentile.
	Alternative Hypotheses	Evening temperature >50°F, so RWC is likely limited (Section 4.3).
	Speciation	IMPROVE data show carbon PM _{2.5} was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are 6.7–15.1 $\mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to 6.7 $\mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.

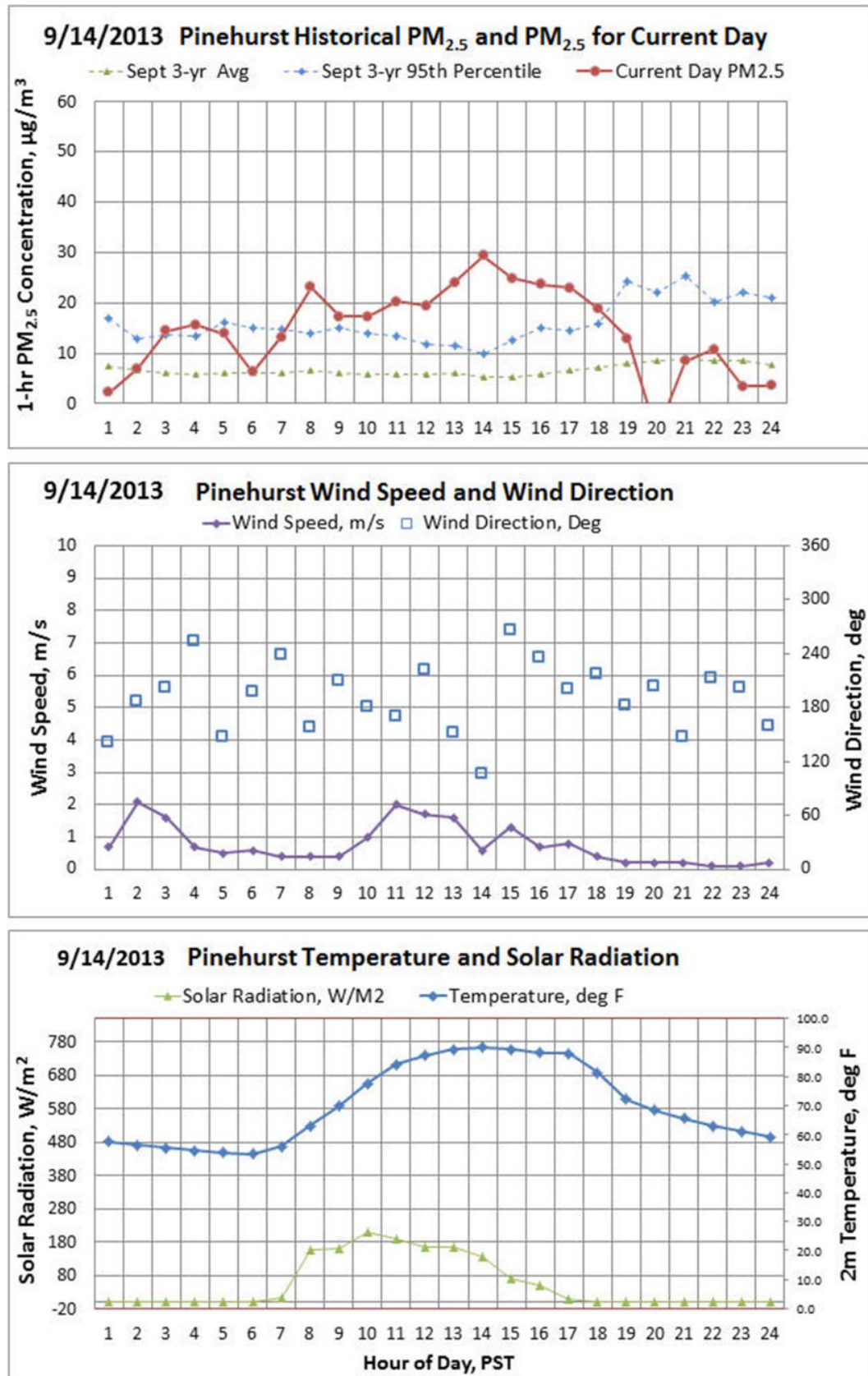




September 14, 2013

Summary of EER Evidence for Pinehurst Monitor Value, $14.4 \mu\text{g}/\text{m}^3$ on 9/14/2013, AQS #16-079-0017 POC 4		
Criterion	Supporting Information	Evidence for this Day
nRCP	Source/Controllability	Source is wildfires, which are not reasonably controllable or preventable (Section 2).
HF	Percentile Rankings	95th percentile seasonally (vs. 2004–2012) (Section 3)
CCR	Conceptual Model	Scenario 1 (Section 4)
	Weather Conditions	The upper-level Rex Block located over British Columbia and the Great Basin support southerly transport of Canadian fires and limited zonal movement of the atmosphere over Idaho.
	Transport Conditions, $\text{PM}_{2.5}$, and wind information. See satellite image with back trajectories and time series.	Smoke descending south from Canadian fires is intersected by back trajectories. More than half of the 24-hour period has elevated $\text{PM}_{2.5}$ values.
	Alternative Hypotheses	Evening temperature $>50^\circ\text{F}$, so RWC is likely limited (Section 4.3). Small prescribed burn intersects back trajectories. Large prescribed burn NE of Pinehurst shows plume blowing away from Pinehurst. Rx burn types listed in Table C-5, Appendix C, are low heat types (pers. comm., M. Boyle, DEQ, 7/15/2016).
	Speciation	IMPROVE data show carbon $\text{PM}_{2.5}$ was higher in region from July to September (Section 4.1).
AAQ	See discussion, Section 5.	Affects Air Quality (AAQ) criterion is satisfied by HF and CCR demonstration.
NE/HAURL	See discussion, Section 6.	Natural event: lightning-caused wildfires. Per EPA, 2013 guidance, if nRCP and CCR criteria are satisfied, the AAQ criteria are also met.
NEBF	See discussion, Section 7 for explanation of NEBF.	Normal fluctuations above the average are $6.7\text{--}15.1 \mu\text{g}/\text{m}^3$ (avg-to-95th percentile); thus, this event contributed up to $7.7 \mu\text{g}/\text{m}^3$. This value is suggestive of the level of impact of the event.
Mitigation	See Section 8 and Appendix D.	AQI forecast released; residents advised of protective actions.





This page intentionally left blank for correct double-sided printing.

Appendix C. Alternative Sources

Crop Residue Burning

The tables in this section summarize the daily burn decisions made by the Crop Residue Burning Program during the 2013 wildfire season. In Idaho, crop residue burning during the summer takes place in August and September. No burning takes place in July. A decision to allow crop residue burning in each burn management area is made each day after evaluating parameters such as Red Flag Warnings by the National Weather Service, current air quality conditions, and atmospheric ventilation.

Crop residue burning was not requested or approved for Bonner, Benewah, or Shoshone Counties during the 2013 period, so those counties are excluded from the following burn decision summary tables, originally published in the *Crop Residue Burning Program 2013 Annual Report* (DEQ 2014). The burn management areas shown in Figure C-1 are referenced in the burn decision summaries (Table C-1–Table C-4).

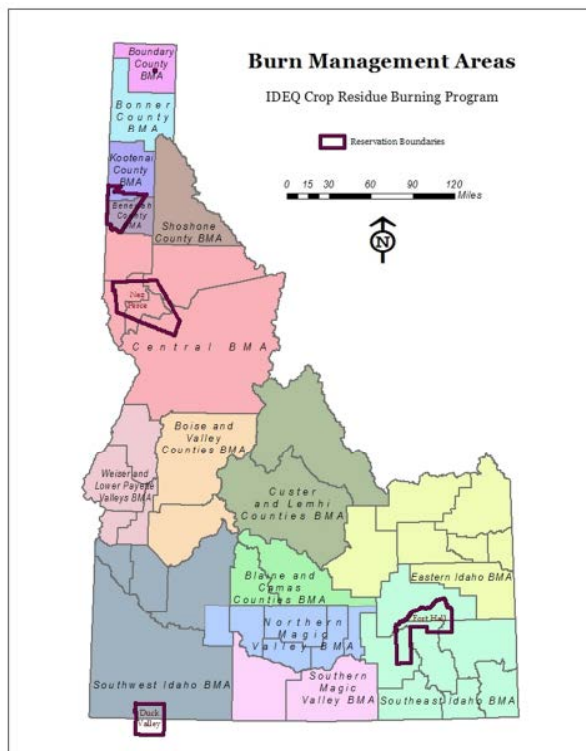


Figure C-1. Burn management areas for the Crop Residue Burning Program.

Table C-1. August burn decisions—northern Idaho.

Burn Decision by Smoke Management Area - Northern Idaho								
Date		Boundary SMA (County)	Kootenai SMA (County)	Central SMA	Clearwater County	Idaho County	Latah County	Nez Perce County
August 1, 2013	Weekend	No Requests	Wind	No Requests	No Requests	No Requests	No Requests	No Requests
August 2, 2013		No Requests	Fuel Moisture	No Requests	No Requests	No Requests	No Requests	No Requests
August 3, 2013								
August 4, 2013								
August 5, 2013	Weekend	No Requests	Fuel Moisture	No Requests	No Requests	No Requests		No Requests
August 6, 2013		No Requests	Fuel Moisture	Burn	No Requests	No Requests	Burn	No Requests
August 7, 2013		No Requests	Burn	Burn	No Requests	No Requests	Burn	No Requests
August 8, 2013		Wind	No Requests	Ventilation	No Requests	Ventilation	Ventilation	No Requests
August 9, 2013	Weekend	Burn	No Requests	Red Flag	No Requests	Red Flag		No Requests
August 10, 2013								
August 11, 2013								
August 12, 2013		No Requests	No Requests	No Requests	No Requests	No Requests	No Requests	No Requests
August 13, 2013	Weekend	No Requests	No Requests	Burn	No Requests	Burn	No Requests	No Requests
August 14, 2013		No Requests	No Requests	Ventilation	No Requests	Ventilation	No Requests	No Requests
August 15, 2013		No Requests	No Requests	Grower not ready	No Requests	Grower not ready	No Requests	No Requests
August 16, 2013		Ventilation	No Requests	Grower not ready	No Requests	Grower not ready	No Requests	No Requests
August 17, 2013	Weekend							
August 18, 2013								
August 19, 2013		Burn	No Requests	No Requests	No Requests	No Requests	No Requests	No Requests
August 20, 2013		Burn	No Requests	Burn	No Requests	Burn	No Requests	Burn
August 21, 2013	Weekend	Ventilation	No Requests	Burn	No Requests	Burn	No Requests	Burn
August 22, 2013		Burn	No Requests	Red Flag	No Requests	Red Flag	Red Flag	Red Flag
August 23, 2013		Red Flag	No Requests	Red Flag	No Requests	Red Flag	Red Flag	Red Flag
August 24, 2013								
August 25, 2013	Weekend							
August 26, 2013		Fuel Moisture	No Requests			Burn	Fuel Moisture	Burn
August 27, 2013		Burn	No Requests	Burn	Burn	Burn	Burn	Burn
August 28, 2013		Harvest	No Requests	Burn	Burn	Burn	Burn	Burn
August 29, 2013	Weekend	Harvest	No Requests	Burn	Burn	Burn	Grower not ready	Burn
August 30, 2013		Poor Met. Cond.	No Requests	Burn	Grower not ready	Burn	Grower not ready	Grower not ready
August 31, 2013								

Note: Red Flag = National Weather Service issued a red-flag warning for high fire risk
 Air Quality = Burn approval was not acceptable based on current or forecasted air quality levels
 Ventilation = The ability of the atmosphere to disperse smoke was unsuitable for good smoke management

Table C-2. September burn decisions—northern Idaho.

		Burn Decision by Smoke Management Area - Northern Idaho						
Date		Boundary SMA (County)	Kootenai SMA (County)	Central SMA	Clearwater County	Idaho County	Latah County	Nez Perce County
September 1, 2013	Weekend							
September 2, 2013	Holiday							
September 3, 2013		Poor Met. Cond.	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation
September 4, 2013		Burn	Burn	Burn	Burn	Burn	Burn	Burn
September 5, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture
September 6, 2013		Fuel moisture	No requests	Burn	Burn	Fuel moisture	Fuel moisture	Fuel moisture
September 7, 2013	Weekend							
September 8, 2013	Weekend							
September 9, 2013		Burn	No requests	Burn	Burn	Burn	Burn	Burn
September 10, 2013		Burn	No requests	Burn	Burn	Burn	Burn	Wind
September 11, 2013		Burn	No requests	Burn	Burn	Burn	Ventilation	Ventilation
September 12, 2013		Burn	No requests	Burn	Burn	Burn	Burn	Ventilation
September 13, 2013		Ventilation	No requests	Burn	Burn	Burn	Burn	Burn
September 14, 2013	Weekend							
September 15, 2013	Weekend							
September 16, 2013		Fuel moisture	No requests	Burn	Burn	Burn	Burn	Burn
September 17, 2013		Fuel moisture	No requests	Burn	Burn	Burn	Burn	Grower not ready
September 18, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture
September 19, 2013		Fuel moisture	No requests	Burn	Fuel moisture	Fuel moisture	Burn	Burn
September 20, 2013		Fuel moisture	No requests	Burn	Wind	Burn	Burn	Burn
September 21, 2013	Weekend							
September 22, 2013	Weekend							
September 23, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	No requests	Fuel moisture	Fuel moisture
September 24, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	No requests	Fuel moisture	Fuel moisture
September 25, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture
September 26, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	No requests	Fuel moisture	Fuel moisture
September 27, 2013		Poor Met. Cond.	No requests	Fuel moisture	Fuel moisture	Fuel moisture	Burn	Burn
September 28, 2013	Weekend							
September 29, 2013	Weekend							
September 30, 2013		Fuel moisture	No requests	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture	Fuel moisture

Note: Fuel Moisture = Fuel or soil moisture levels were not appropriate for burn approval
 Wind = Current or forecasted wind velocities were not appropriate for burn approval
 Ventilation = The ability of the atmosphere to disperse smoke was unsuitable for good smoke management

Table C-3. August burn decisions—southern Idaho.

		Burn Decision by Smoke Management Area - Southern Idaho						
Date		Southwest Idaho	Southern Magic	Northern Magic	Southeast Idaho	Eastern Idaho	Weiser and Payette	Blaine and Camas
August 1, 2013		Red Flag	Red Flag	Red Flag	No Requests	No Requests	Red Flag	No Requests
August 2, 2013		Burn	Burn	No Requests	No Requests	No Requests	Burn	No Requests
August 3, 2013	Weekend							
August 4, 2013	Weekend							
August 5, 2013		Burn	Burn	Red Flag	Burn	Red Flag	No Requests	No Requests
August 6, 2013		Burn	Burn	Burn	No Requests	No Requests	No Requests	No Requests
August 7, 2013		Red Flag	Burn	Burn	Burn	No Requests	No Requests	No Requests
August 8, 2013		Burn	Red Flag	Red Flag	No Requests	No Requests	No Requests	No Requests
August 9, 2013		Burn	Burn	Burn	No Requests	No Requests	No Requests	No Requests
August 10, 2013	Weekend							
August 11, 2013	Weekend							
August 12, 2013		Air Quality	Red Flag	Burn	Burn	No Requests	No Requests	No Requests
August 13, 2013		Burn	Burn	Burn	Red Flag	Red Flag	No Requests	No Requests
August 14, 2013		Air Quality	Air Quality	Air Quality	Burn	Burn	No Requests	No Requests
August 15, 2013		Air Quality	Air Quality	Air Quality	Air Quality	Air Quality	No Requests	No Requests
August 16, 2013		Air Quality	Air Quality	Air Quality	Air Quality	Air Quality	No Requests	No Requests
August 17, 2013	Weekend							
August 18, 2013	Weekend							
August 19, 2013		Burn	Burn	Burn	Burn	Burn	No Requests	No Requests
August 20, 2013		Red Flag	Red Flag	Red Flag	Burn	Burn	No Requests	No Requests
August 21, 2013		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	No Requests	No Requests
August 22, 2013		Red Flag	Red Flag	Red Flag	Red Flag	Red Flag	No Requests	No Requests
August 23, 2013		Burn	Burn	Burn	Red Flag	Red Flag	No Requests	No Requests
August 24, 2013	Weekend							
August 25, 2013	Weekend							
August 26, 2013		Burn	Burn	Burn	Burn	Burn	No Requests	No Requests
August 27, 2013		No Requests	Red Flag	Red Flag	Burn	Burn	No Requests	No Requests
August 28, 2013		No Requests	Red Flag	Red Flag	Burn	Burn	No Requests	No Requests
August 29, 2013		No Requests	Burn	Burn	Burn	Burn	No Requests	No Requests
August 30, 2013		No Requests	Burn	Burn	Burn	Burn	No Requests	No Requests
August 31, 2013	Weekend							

Note: Red Flag = National Weather Service issued a red-flag warning for high fire risk
 Air Quality = Burn approval was not acceptable based on current or forecasted air quality levels

Table C-4. September burn decisions—southern Idaho.

		Burn Decision by Smoke Management Area - Southern Idaho						
		Southwest Idaho	Southern Magic	Northern Magic	Southeast Idaho	Eastern Idaho	Weiser and Payette	Blaine and Camas
Date								
September 1, 2013	Weekend							
September 2, 2013	Holiday							
September 3, 2013		Fuel Moisture	Fuel Moisture	Fuel Moisture	Fuel Moisture	Fuel Moisture	No Requests	No Requests
September 4, 2013		Fuel Moisture	Fuel Moisture	Burn	Burn	Burn	No Requests	No Requests
September 5, 2013		Fuel Moisture	Fuel Moisture	Fuel Moisture	Burn	Fuel Moisture	No Requests	No Requests
September 6, 2013		Fuel Moisture	Fuel Moisture	Fuel Moisture	Burn	Burn	No Requests	No Requests
September 7, 2013	Weekend							
September 8, 2013	Weekend							
September 9, 2013		Burn	Burn	Burn	Burn	Fuel Moisture	No Requests	No Requests
September 10, 2013		No Requests	Burn	Burn	Burn	Burn	No Requests	No Requests
September 11, 2013		No Requests	No Requests	Burn	Burn	Burn	No Requests	No Requests
September 12, 2013		Fuel Moisture	Fuel Moisture	Fuel Moisture	Fuel Moisture	Fuel Moisture	No Requests	No Requests
September 13, 2013		Fuel Moisture	Fuel Moisture	Fuel Moisture	Burn	Fuel Moisture	No Requests	No Requests
September 14, 2013	Weekend							
September 15, 2013	Weekend							
September 16, 2013		Burn	No Requests	No Requests	Burn	Burn	No Requests	No Requests
September 17, 2013		Wind	Burn	No Requests	Wind	Fuel Moisture	No Requests	No Requests
September 18, 2013		Burn	Wind	No Requests	Wind	Fuel Moisture	No Requests	No Requests
September 19, 2013		Burn	No Requests	No Requests	Wind	Burn	No Requests	No Requests
September 20, 2013		Wind	Wind	No Requests	Burn	Burn	No Requests	No Requests
September 21, 2013	Weekend							
September 22, 2013	Weekend							
September 23, 2013		Burn	Wind	No Requests	Burn	Burn	No Requests	No Requests
September 24, 2013		Fuel Moisture	Burn	No Requests	Burn	Burn	No Requests	No Requests
September 25, 2013		Fuel Moisture	Fuel Moisture	No Requests	Fuel Moisture	Fuel Moisture	No Requests	No Requests
September 26, 2013		Fuel Moisture	Fuel Moisture	No Requests	Fuel Moisture	Fuel Moisture	No Requests	No Requests
September 27, 2013		Fuel Moisture	Fuel Moisture	No Requests	Fuel Moisture	Fuel Moisture	No Requests	No Requests
September 28, 2013	Weekend							
September 29, 2013	Weekend							
September 30, 2013		Fuel Moisture	Fuel Moisture	No Requests	Fuel Moisture	Fuel Moisture	No Requests	No Requests

Note: Fuel Moisture = Fuel or soil moisture levels were not appropriate for burn approval
 Wind = Current or forecasted wind velocities were not appropriate for burn approval

Prescribed Fires

Most prescribed fires occur in the fall. The prescribed fires in Table C-5 are tracked and reported by the Montana/Idaho Airshed Group (<http://www.smokemu.org/>).

Table C-5. Prescribed fires in Idaho, July 1–September 14, 2013.

Date	Burn Type	Burned Acres	Latitude	Longitude
9/12/2013	Wildlife Habitat	182	47.92300034	-116.0210037
9/12/2013	Wildlife Habitat	416	47.94400024	-116.0279999
9/13/2013	Wildlife Habitat	134	47.95669937	-116.0479965
9/13/2013	Wildlife Habitat	213	47.9612999	-116.0309982
9/13/2013	Wildlife Habitat	32	47.95349884	-116.026001
9/14/2013	Wildlife Habitat	650	47.98099899	-116.0790024
9/14/2013	Wildlife Habitat	125	47.97660065	-116.0859985
9/14/2013	Jackpot	25	47.41799927	-115.8679962

All prescribed fires took place from September 12–14, 2013, and all were within 30 miles of Pinehurst (Figure C-2).

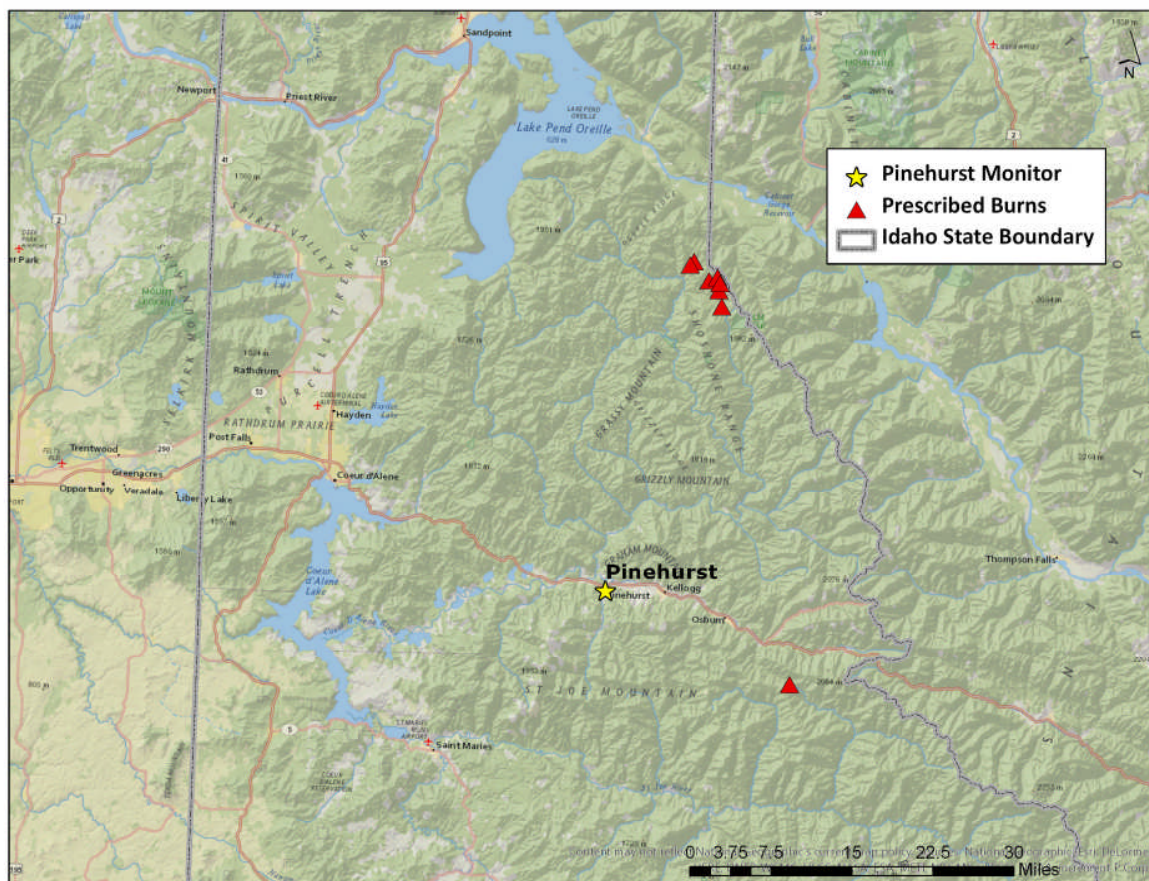


Figure C-2. Prescribed fires in Idaho during wildfire period.

Appendix D. Mitigation–Smoke Advisory Products

During the wildfire season, DEQ releases a number of smoke advisory products. The staff meteorologist summarizes the weather conditions expected in Idaho regions and forecasts the smoke movement for the coming day (Figure D-1).

Updated Noon MDT Wednesday, August 28, 2013

Valid through Noon MDT Friday, August 30, 2013

Smoke Outlook

Idaho DEQ has lifted a Stage 1 Forecast and Caution for Camas and Blaine Counties. All DEQ-issued Stage 1 forecast and cautions have been lifted.

Atlanta continues to be impacted by smoke from the Little Queens fire to the north. Air quality reached Unhealthy yesterday. Today, air quality is expected to be similar to yesterday. Air quality is worse in the morning and then improves to the good to moderate category during the afternoon and evening hours, before returning to Unhealthy. **Atlanta is forecast to be Unhealthy for Sensitive Groups today with periods of Unhealthy.**

Sensitive groups such as people with heart and/or lung disease, adults over age 65, young children, and pregnant women should avoid all outdoor activities until air quality improves. Everyone else should minimize outdoor activities. When air quality is in the hazardous category (visibility of less than 1 mile) everyone should stay indoors and avoid exertion.

Ketchum continues to experience air quality in the Moderate to Unhealthy for Sensitive Groups category in the morning before improving to good air quality by afternoon.

Today poses the last day of significant lightning threat in southern Idaho as the upper level ridge strengthens and effectively cuts off any monsoon moisture from reaching Idaho, except for a sliver of the extreme Southeast Idaho near Bear Lake. Winds speeds continue to be moderate to strong as upper level winds of 50 mph or so are overhead with the possibility of mixing down to the surface. Mixing heights look to be from 6K-10K feet AGL with the mid-level moisture being the limiting factor over some air sheds. Red Flag Warnings over southwestern and south-central Idaho today through this evening. No red flags are listed in Eastern Idaho as fuels have been reported as non-critical due to precipitation received late last week. Weather-wise, all of the criteria for a Red Flag Warning have been met, but fuel condition is the reason behind non-issuance in those zones. This pattern of warm and dry conditions will persist through Sunday, while model confidence is low in what will happen beyond Sunday.

Smoke impacts for today will likely continue to be light and cover the Stanley and Salmon areas from the Little Queens fire and the Rim fire in California. Smoke from several fires in southeastern Washington is likely to impact Idaho from Lewiston and Lapwai all the way north to the Idaho-Canadian border along the Highway 95 corridor, depending on fire activity. Winds are expected to shift from the south to the southwest this afternoon, and then from the west by Friday and into this weekend. This afternoon and Thursday, areas to the northeast of fires may experience light to moderate smoke impacts and by Friday those areas east of fires may experience light to moderate smoke impacts.

6 emergency monitors have been installed in Idaho to help monitor smoke impacts from wildfires:

- DEQ has installed monitors in Mountain Home, Fairfield, Ketchum, and east Boise. The information can be found at <http://app.airsis.com/USFS/fleet.aspx>

- Fairfield – #Idaho1000
- Mountain Home - #Idaho1002
- Ketchum - #Idaho1005
- Boise - #Idaho1003
- The USFS installed monitors in Atlanta and Challis. The information can be found at <http://www.wrcc.dri.edu/cgi-bin/smoke.pl>
- Atlanta monitor is Smoke#13
- Challis monitor is Smoke#21
- Users should be aware that the Forest Service site reports the data in Coordinated Universal Time (UTC). To convert from UTS to Mountain Daylight Time, subtract 6 hours.

View DEQ near-real time monitoring at: <http://airquality.deq.idaho.gov/>

Visit the Idaho Smoke Information Blog at: www.idsmoke.blogspot.com

Smoke forecasts are dependent on predicted fire growth and weather. If conditions change unexpectedly, impacts could occur. When visibility starts to go below 5 miles, sensitive groups should minimize outdoor activities. Everyone else should minimize prolonged or physical activity outdoors. Refer to the [Smoke and Health Tab on the Idaho Smoke Information Blog](#) for additional health information.

Your eyes are your best tools to determine if it's safe to be outside. Even if you smell smoke, the air quality may still be good.

AQI Category	Visibility (miles)
Good	11+
Moderate	6-10
Unhealthy for Sensitive Groups	3-5
Unhealthy	1½ -2¾
Very Unhealthy	1-1¼
Hazardous	Less than 1

Figure D-1. Example of daily smoke outlook released by DEQ.

A wildfire update is also released as a daily product (Figure D-2 and Figure D-3). This product typically includes a summary of the previous day's monitoring data, any pertinent information regarding individual fires, whether any Stage 1 Advisories are in effect, and relevant satellite imagery plotted on a map along with smoke monitor locations.

Wildfire update for Friday, August 16

Smoke Forecast for 8/16 through the weekend:

- Moderate smoke in the Boise/Mountain Home area this morning. This smoke is expected to clear this afternoon when the smoke is transported to the northeast. The transported smoke should reach the Ketchum, Stanley, and Challis areas by mid-afternoon today. This pattern is expected to repeat itself tomorrow and Sunday morning. The smoke impacts are expected to be light to moderate on Saturday morning and moderate to heavy on Sunday in the Boise/Mountain areas. The central mountains are expected to have moderate smoke impacts with periods of heavy smoke during the morning hours on both Saturday and Sunday.
- Ketchum is currently experiencing Unhealthy to Hazardous air quality. Smoke from the Beaver Creek Complex will continue to impact Ketchum throughout the day. See the webcam image below. The TEOM in Ketchum is experiencing malfunctions. DEQ is currently installing an E-bam to supplement the data. This e-bam data will be available later today on the interagency website listed below.
- Modeling is forecasting widespread smoke across Idaho. Most areas will see light smoke impacts. Areas near the fires will continue to see heavy smoke. See the image below from the Bluesky modeling run for Sunday afternoon.

Air Quality Advisories:

- Ada and Canyon counties are under a Yellow Air Quality Alert for today.
- Stage 1 is in effect through Monday 8/19, at which time they will be re-evaluated
 - Boise
 - Valley
 - Blaine
 - Camas
 - Custer
 - Lemhi

Significant Fires impacting Idaho (** denotes new fire since yesterday): there was an increase in fire activity yesterday. The Gold Pan complex showed more activity yesterday than in the past week.

Fire/Location	Current Size/Containment	Yesterday's fire activity
Elk Complex: 10 miles SW of Pine	125,000 acres (40% contained, estimated containment 10/1)	Extreme fire behavior with crown runs and long-range spotting. The fire increased by 4,937 acres yesterday.
Pony Complex: 12 miles N of Mountain Home	147,881 acres (80% contained, estimated containment 8/18)	Creeping and smoldering. The fire increased by 75 acres yesterday.
Beaver Creek Complex: 12 miles NE of Fairfield	55,000 (9% contained, no estimated containment date)	Extreme fire behavior with crowning. The fire increased by 10,800 acres yesterday.
McCann: 4 miles NW of Fairfield	23,389 (70% contained, no estimated containment date)	Creeping, smoldering with single tree torching. The fire did not increase in size yesterday.
Lodgepole: 10 miles W of Challis	22,753 (74% contained, no estimated containment date)	Creeping with isolated torching. The fire did not increase in size yesterday.
Gold Pan Complex: 35 miles SW of Conner, MT (in the Bitterroot NF)	18,059 acres (no information on containment)	Active fire behavior with short crown runs and spotting. The fire increased by 801 acres yesterday.
State: 11 W of Malad (just across the UT/ID Border)	25,400 acres (60% contained, estimated containment 8/16)	Active fire behavior. The fire increased by 1,293 acres yesterday.

Figure D-2. Example 1: daily wildfire update.

Yesterday's monitoring data:

Monitor/Location		Maximum concentration				8/27/2013	Today's Trend/forecast
		1-hour	3-hr	8-hour	24-hour		
Coeur d'Alene Regional Office							
Boundary County							
	Copeland	5	4	4	3		
	Porthill Int. Border	5	5	4	4		
Kootenai County							
	Lancaster	14	10	5	3		
	Sandpoint	8	5	4	2		
	St Maries	7					
	Pinehurst	8	6	5	3		
Lewiston Regional Office							
Latah County							
	Kendrick	7	6	6	5		
	Moscow	13	9	6	2		
	Potlatch	5	5	5	4		
	Lewiston	8	6	5	3		
Idaho County							
	Grangeville	19	17	16	8		
	Cottonwood	28	20	13	6		
Boise Regional Office							
	McCall	23	21	18	13		
	Idaho City	22	19	23	7		
	Garden Valley	26	23	24	14		
	Weiser	19	19	18	15		
	Nampa	23	22	22	14		
	Meridian	25	23	27	15		
Twin Falls Regional Office							
	Ketchum	0					
	Twin Falls	15	9	7	4		
	Paul	4	3	3	3		
Pocatello Regional Office							
	Pocatello	5	4	2	2		
	Soda Springs	5	4	3	3		
	Franklin	9	8	6	4		
Idaho Falls Regional Office							
	Idaho Falls	5	5	4	2		
	Salmon	42	37	27	16		Good/Moderate
	Rexburg (PM2.5)	4	4	4	3		
Emergency Monitors							
	Atlanta	228	157	113	47		
	Fairfield	10	7	9	4		
	Challis - USFS	27	20	16	8		
	Boise E-bam	32	29	27	15		
	Mountain Home	75	28	15	9		
	Ketchum	79	69	42	15		

All Stage 1 Forecast and Cautions issued by DEQ have been lifted.

Fire Update: Only Kelley fire and the Gold Pan Complex showed up on MODIS with heat in the 6-12 hours

Gold Pan Complex – grew 571 acres, active fire behavior with torching and spotting

Lolo Creek Complex – grew 10 acres yesterday, active fire behavior with occasional torching and short-range spotting.

Kelley (near Featherville) grew 50 acres yesterday, active fire behavior with torching and spotting

Little Queens – grew 1205 acres yesterday, moderate fire behavior with group torching and short-range spotting

Satellite Images:

Yesterday's morning MODIS image (see below) shows smoke from the Rim fire in California heading north to the Lewiston area before turning to the east towards Montana. The afternoon image shows the same smoke trajectory.

Smoke Forecast:

Today poses the last day of significant lightning threat in southern Idaho as the upper level ridge strengthens and effectively cuts off any monsoon moisture from reaching Idaho, except for a sliver of the extreme Southeast Highlands. Winds speeds continue to be moderate to strong as upper level winds of 50 mph or so are overhead with the possibility of mixing down to the surface. Mixing heights look to be from 6K-10K feet AGL with the mid-level moisture being the limiting factor over some air sheds. Red Flag Warnings over southwestern and south-central Idaho today through this evening. No red flags are listed in Eastern Idaho as fuels have been reported as non-critical due to precipitation received late last week. Weather-wise, all of the criteria for a Red Flag Warning have been met, but fuel condition is the reason behind non-issuance in those zones.

Smoke impacts for today will likely continue to be light and cover the Stanley and Salmon areas from the Little Queens fire and the Rim fire in California. Smoke from several fires in southeastern Washington is likely to impact Idaho from Lewiston and Lapwai all the way north to the Idaho-Canadian border along the Highway 95 corridor. Winds are expected to shift from the south to the southwest this afternoon, and then from the west by Friday and into this weekend.

This pattern of warm and dry conditions will persist through Sunday, while an upper level low-currently over the Aleutian Islands-is expected to enter the Pacific Northwest. The timing of this entry will depend whether or not this low is strong enough to break down the ridge.

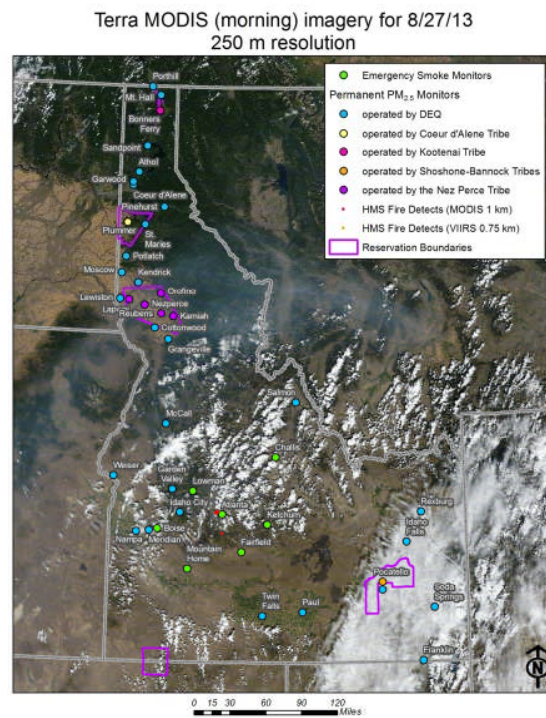


Figure D-3. Example 2: daily wildfire update.

Appendix E. Supplemental Materials

8/7/2013

Memo

To: File

From: R. Paul/ M. Boyle

Date: 08/07/13

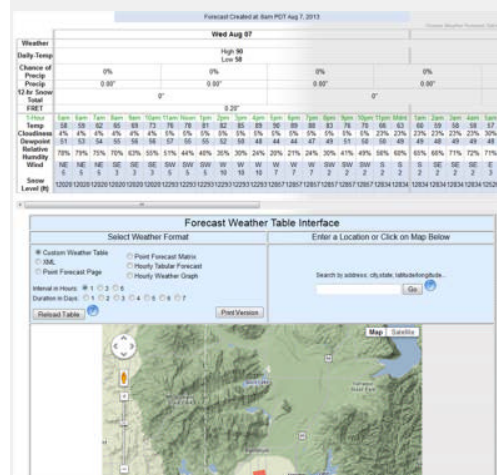
Re: Burn Day Rathdrum Prairie

1. Burn Decision Synopsis

After reviewing the forecasted meteorological conditions CRO suggested to make up to 370 acres available for possible burning today. Models were forecasting a southwest/west-southwest winds in the afternoon. Soil moisture was checked on 8/7 in the afternoon and appeared to be in the 35-40% range (soil feel & appearance method). Finally, school is not yet in session which will allow a slightly larger "smoke trajectory" path. Burn time was identified as 12-4pm based on forecasted temperatures. The proposed burns were discussed by phone with the North Idaho Burn Coordinator at between 8:30 – 9:00am. Actual on-site conditions will be determining factor prior to igniting the field.

2. Met and AQ Data Review

a. Spot Forecast

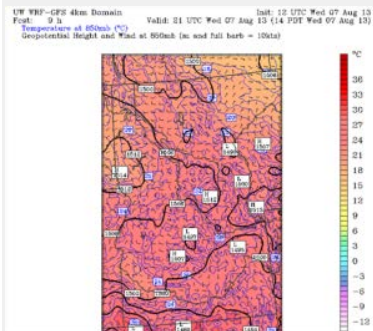


b. Pseudo Soundings

Morning Forecasting for Kootenai														
Model Resolution:	1.3km		Model Run:				2013080500		SiteID:	KCOE	Name:	COURT D'ALEME, ID		
Date:		Time in PDT												
8/5/2013	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	Comments	
Wind Index	P	P	M	G	G	G	G	G	G	NP	NP	NP	G = 4700, M = (2000 - 4700)	
G: peak 10 averaged, P: peak 1000 year peak	1296	1352	1332	1243	1087	8738	-9099	-9099	-9099	1075	136	46	P = (200 - 2000), NP = <200	
Surface (20m) Winds	Direction	SSW	WSW	WSW	WSW	WSW	WSW	SW	SW	W	W	WSW	WSW	
	Speed (mph)	5.8	4.4	6.4	10.2	11.2	18.6	11.6	10.8	9.8	4.0	4.3	Change text for surface wind speed: >12 mph and <15 mph	
Surface (20m) Temperature (degrees F)	76.9	78.9	80.9	82.7	83.6	84.5	85.2	85.2	85.0	82.5	79.6	75.1	Red text for surface wind speed: >15 mph	
Surface (20m) Relative Humidity (%)	34.7	31.6	29.2	26.1	24.2	22.4	21.3	21.2	20.7	20.6	20.8	20.4		
Planetary Boundary Layer (PBL)	Height (feet)	2041	2010	2040	1849	1512	1212	7840	7460	197	260	85	Height is above model terrain surface	
	Direction	SW	SW	SW	WSW	WSW	W	W	W	W	W	W	WSW	
	Speed (mph)	6.8	10.0	10.0	13.9	15.6	16.6	14.5	12.8	6.3	7.0	5.2	1 km = 0.75 mph	
700mb (~10,000 ft MSL)	Height (feet)	7432	7432	7432	7432	7432	7432	7432	7432	7432	7432	7432	Height is above model terrain surface	
	Direction	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	WSW	WSW	
	Speed (mph)	17.6	17.4	18.1	18.3	17.0	18.2	16.6	14.6	12.0	8.9	7.3	6.1	10 km = 11.3 mph
500mb (~5,000 ft MSL)	Height (feet)	2544	2544	2544	2544	2544	2544	2544	2544	2544	2544	2544	Height is above model terrain surface	
	Direction	SW	WSW	SW	WSW	WSW	WSW	WSW	WSW	W	W	WSW	W	10 km = 11.3 mph
	Speed (mph)	9.8	6.3	6.7	10.6	12.0	13.0	13.6	13.0	13.1	11.3	12.2	10 km = 11.3 mph	

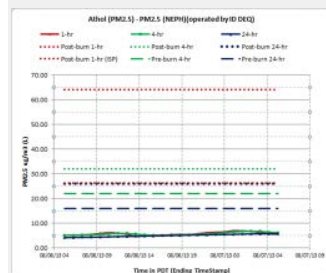
Morning Forecasting for Kootenai													
Model Resolution:	1.3km	Model Run:			2013080500			SiteID:	KDTL	Name:	SPOKANE, WA		
Date:		Time in PDT											
8/5/2013		10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM
Wind Index:		P	P	M	G	G	G	G	G	NP	P	P	P
G: peak 10 average, P: peak 100 average		1142	1183	1242	1288	-9099	-9099	-9099	-9099	360	147	424	447
		G = 4700, M = (2000 - 4700), NP = <2000, P = (200 - 2000), NP = <200											
Surface (20m) Winds		Direction	SSW	SW	SW	WSW	W	WSW	WSW	WSW	WSW	SW	SW
Speed (mph)		6.1	6.5	8.1	9.9	11.3	10.7	12.5	10.7	11.6	6.1	8.1	11.1
Surface (20m) Temperature (degree F)		74.4	78.0	80.5	83.2	84.5	85.2	85.2	85.0	84.5	82.1	78.2	74.8
Surface (20m) Relative Humidity (%)		39.4	33.1	29.7	23.7	20.0	20.4	16.8	16.9	14.8	21.3	26.4	31.7
Planetary Boundary Layer (PBL)		Height (feet)	1433	2129	2399	1889	7398	8173	7192	3783	177	364	438
Direction		WSW	WSW	W	WSW	WSW	W	WSW	W	W	WSW	WSW	WSW
Speed (mph)		6.8	7.8	12.9	14.9	16.1	12.6	10.7	11.6	11.4	10.6	12.3	17.3
700mb (~10000 ft MSL)		Height (feet)	7431	7431	7431	7431	7431	7431	7431	7431	7431	7431	7431
Direction		WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	WSW	WSW	WSW	WSW
Speed (mph)		17.1	18.0	16.1	16.2	14.1	12.3	10.7	11.8	7.7	8.3	8.3	7.1
500mb (~5000 ft MSL)		Height (feet)	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543	2543
Direction		W	W	WSW	WSW	WSW	WSW	WSW	W	W	W	W	W
Speed (mph)		10.4	10.1	9.5	11.6	13.3	13.6	14.4	13.6	12.2	11.8	10.6	

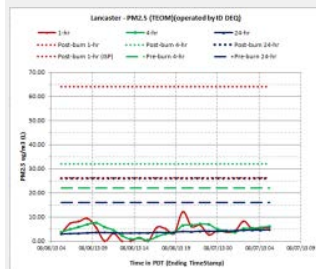
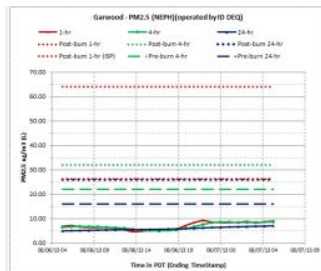
c. Weather Model



d. Air Quality Data

i. DEQ





ii. WDOE Ozone Data:

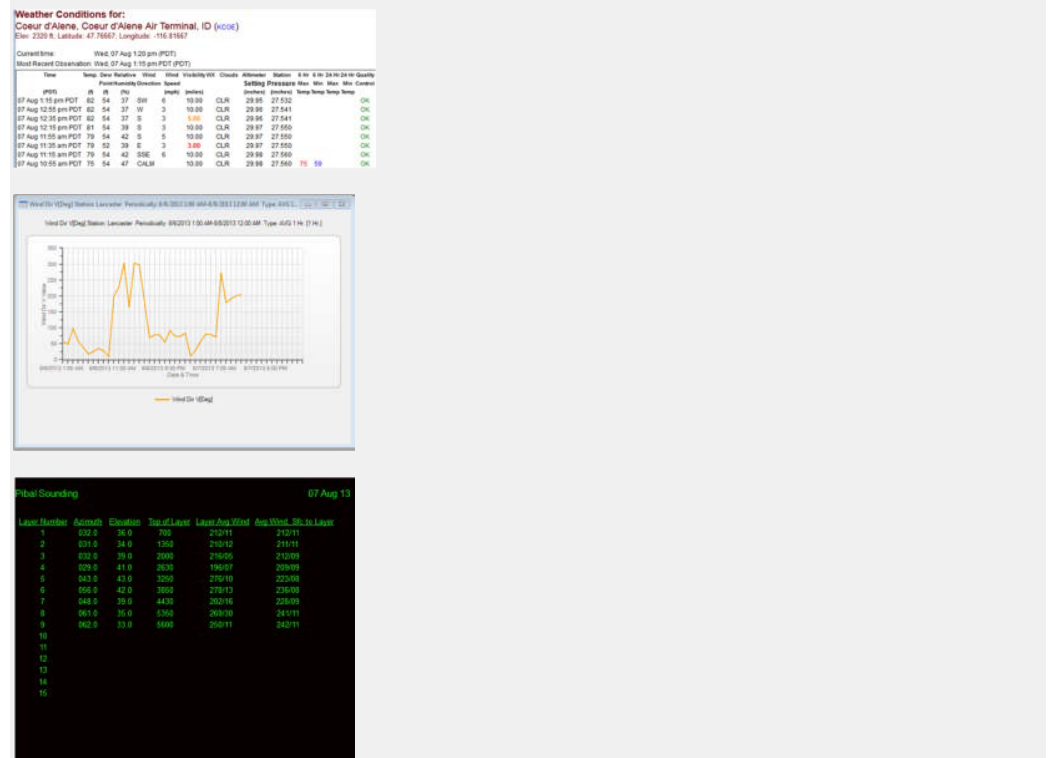
Site:Spokane-Greenbluff -		
Date	Time	O3
		ppm
8/6/2013	12:00 AM	0.028
8/6/2013	1:00 AM	0.028
8/6/2013	2:00 AM	
8/6/2013	3:00 AM	0.025
8/6/2013	4:00 AM	0.025
8/6/2013	5:00 AM	0.017
8/6/2013	6:00 AM	0.02
8/6/2013	7:00 AM	0.019
8/6/2013	8:00 AM	0.024
8/6/2013	9:00 AM	0.031
8/6/2013	10:00 AM	0.038
8/6/2013	11:00 AM	0.046
8/6/2013	12:00 PM	0.049
8/6/2013	1:00 PM	0.051
8/6/2013	2:00 PM	0.058
8/6/2013	3:00 PM	0.059
8/6/2013	4:00 PM	0.06
8/6/2013	5:00 PM	0.057
8/6/2013	6:00 PM	0.041
8/6/2013	7:00 PM	0.043
8/6/2013	8:00 PM	0.046
8/6/2013	9:00 PM	0.047
8/6/2013	10:00 PM	0.047
8/6/2013	11:00 PM	0.042
8/7/2013	12:00 AM	0.045
8/7/2013	1:00 AM	0.042
8/7/2013	2:00 AM	0.037
8/7/2013	3:00 AM	0.035
8/7/2013	4:00 AM	0.03
8/7/2013	5:00 AM	0.025
8/7/2013	6:00 AM	0.022
8/7/2013	7:00 AM	0.028
8/7/2013	8:00 AM	0.035
Minimum		0.017
MinDate		6-Aug

3. Expected Conditions

Wind direction and temp forecasted for today should aid in proper smoke management. Forecast for a westerly component with winds should help to limit ground smoke up the trench towards Garwood, etc. Will launch a pibal balloon to confirm transport winds.

4. Burn window

a. Pre-Ignition Temperature/Weather Data



b. Communications/Observations

12:13 Ralph contacted me and provided the pibal field info. I entered the data into the program and relayed the processed data information to Ralph over the phone.

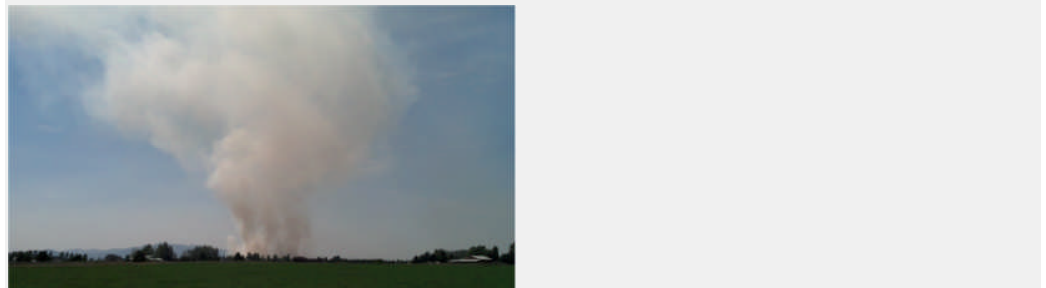
12:21 I spoke to Melissa over the phone and requested approval for the fields. We also discussed wind direction requirements for the two fields and I verbally relayed the current pibal data.

12:23 I e-mailed pibal information to Gary, Melissa, and Brian. Melissa and I discussed current wind direction per pibal info

Aprox 12:25 Melissa contacted me and told me fields were "approved".

12:30 Spoke to Brian over the phone gave him OK to proceed.

1:10 Brian contacted me and updated me on the progress and also sent a photo (below). The picture depicted good columnar lift occurring. Brian reported that the smoke was behaving as expected at this time. Brian reported that there was a delay in the initial lighting because the growers water truck broke down momentarily. Once they got it running they commenced ignition. Initial ignition was reported to begin at ~12:45.



1:46 Brian called to report fire was just about out. Reported some ground smoke odor north along highway 95 per last communication with Ralph. Transport smoke was going well to the east there was a good amount of smoke but it appeared it was staying aloft well. Brian mentioned that there was some fire activity erupting and would get back to me. I reported to Brian that the last airport reading at 1:35 indicated a SE wind.

2:00 I looked at NWS CDA airport data again, wind had returned to SW

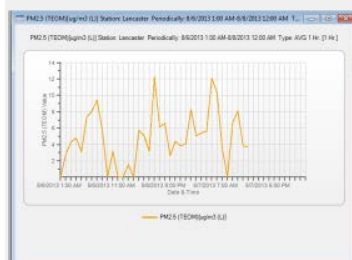
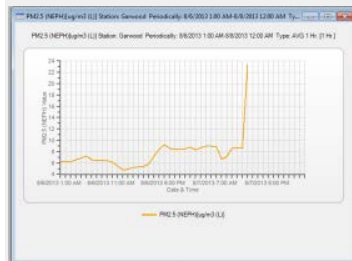
c. Weather Data

Weather Conditions for:
Coeur d'Alene, Coeur d'Alene Air Terminal, ID (KCOE)
Elev: 2320 ft, Latitude: 47.76667, Longitude: -116.81667

Current time: Wed, 07 Aug 1:58 pm (PDT)
Most Recent Observation: Wed, 07 Aug 1:55 pm (PDT)

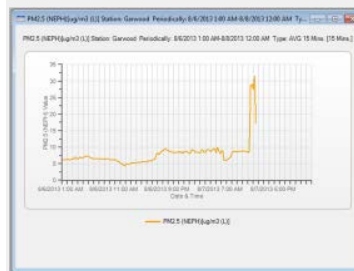
Time (PDT)	Temp (F)	Dew (F)	Relative Hum (%)	Wind Direction	Wind Speed (mph)	Wind Gust (mph)	Visibility (mi)	Clouds	Altimeter (inches)	Station (inches)	6 Hr Max	6 Hr Min	24 Hr Max	24 Hr Min	Quality
07 Aug 1:55 pm PDT	84	52	33	SSW	6		10.00	CLR	29.94	27.522					OK
07 Aug 1:35 pm PDT	84	54	35	SE	5		9.00	CLR	29.95	27.532					OK
07 Aug 1:15 pm PDT	82	54	37	SW	6		10.00	CLR	29.95	27.532					OK
07 Aug 12:55 pm PDT	82	54	37	W	3		10.00	CLR	29.96	27.541					OK
07 Aug 12:35 pm PDT	82	54	37	S	3		10.00	CLR	29.96	27.541					OK
07 Aug 12:15 pm PDT	81	54	39	S	3		10.00	CLR	29.97	27.550					OK
07 Aug 11:55 am PDT	79	54	42	S	5		10.00	CLR	29.97	27.550					OK
07 Aug 11:35 am PDT	79	52	38	E	3		10.00	CLR	29.97	27.550					OK
07 Aug 11:15 am PDT	79	54	42	SSE	5		10.00	CLR	29.98	27.560					OK

2:04 Ralph and Brian called to ask about any complaints so far today. I reported non had come in. I also reported the last hour data from Athol (8ug) and Garwood (23ug). Garwood data indicates it received some surface smoke. Athol did not record impact yet. Ralph didn't expect it would because his observations indicated smoke was to the east of highway 95 but there was some areas of odor on 95.





2:31 I polled Garwood Neph and noted AQ appeared to be clearing out. The last 15 min average was 17ug.



2:34 Ralph called to report ignition was commencing on the 220 acre field. Igniting NE corner now, really good flames and going well already. Ralph indicated the pre-approval winds as SW @ 6 mph.

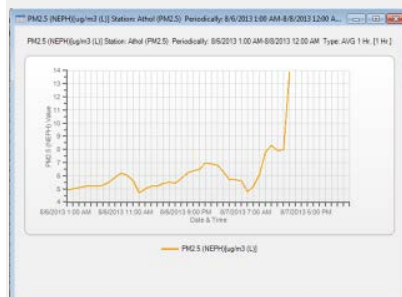
2:48 Brian called to report fire had jumped Huetter Rd and was burning wheat field near the SE corner of the KBG field.

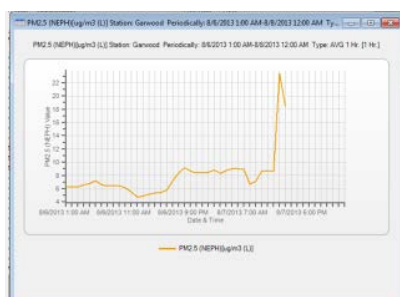
3:04 Brian called and reported wheat field was being attacked and would likely burn to the pivot area then burn itself out if it gets that far. Grass field is continuing to be ignited. It is burning fairly quickly and getting good lift and good column formation at this time. Brian commented that there were a lot of observers along the sides of the road and near Karleens field. Brian suggested to some of them that he was near that they get out of the way. I reported that ground smoke had reached the Athol area and the Garwood monitor had since cleared.

Weather Conditions for:
Coeur d'Alene, Coeur d'Alene Air Terminal, ID (KCOE)
 Elev: 2529 ft, Latitude: 47.76667, Longitude: -116.81667

Current time: Wed, 07 Aug 3:09 pm (PDT)
 Most Recent Observation: Wed, 07 Aug 2:55 pm PDT (PDT)

Time	Temp	Dew	Relative	Wind	Wind	Visibility	Clouds	Altitude	Station	Q	H	6 Hr	24 Hr	24 Hr	Quality
	(F)	(F)	%	Dir	Speed	(mi)	(ft)	(ft)							
07 Aug 2:55 pm PDT	88	50	27	S	5	10.00	CLR	2893	27.513						OK
07 Aug 2:35 pm PDT	88	52	29	W	6	9.00	CLR	2893	27.513						OK
07 Aug 2:15 pm PDT	88	52	31	CALM		10.00	CLR	2894	27.522						OK
07 Aug 1:55 pm PDT	84	52	33	SSW	5	10.00	CLR	2894	27.522						OK
07 Aug 1:35 pm PDT	84	54	35	SE	5	9.00	CLR	2895	27.532						OK
07 Aug 1:15 pm PDT	82	54	37	SW	6	10.00	CLR	2895	27.532						OK
07 Aug 12:55 pm PDT	82	54	37	W	3	10.00	CLR	2896	27.541						OK
07 Aug 12:35 pm PDT	82	54	37	S	3	5.00	CLR	2896	27.541						OK





3:22 Ralph called to update. Reported a nice column, maybe reaching up to 4000' max. there was very little ground smoke at this time smoke looking good, pretty sure everything was lit now. The wheat field was now out.

3:30 I reported to CRB group PM conference call about Rathdrum burns today.

Weather Conditions for:
Coeur d'Alene, Coeur d'Alene Air Terminal, ID (KCOE)
 Elev: 2320 ft, Latitude: 47.76667, Longitude: -116.81667

Current time: Wed, 07 Aug 3:50 pm (PDT)
 Most Recent Observation: Wed, 07 Aug 3:35 pm (PDT)

Time	Temp	Dew	Relative	Wind	Wind	Visibility	Clouds	Altimeter	Station	6 Hr	24 Hr	24 Hr	Quality
(PDT)	(F)	(F)	(%)	(mph)	(kmph)	(miles)	(percent)	(inches)	(inches)	Temp	Temp	Temp	
07 Aug 3:35 pm PDT	90	45	21	W	7	9.00	FEW060	29.91	27.494				OK
07 Aug 3:15 pm PDT	88	48	26	S	5	10.00	CLR	29.92	27.503				OK
07 Aug 2:55 pm PDT	88	50	27	S	5	10.00	CLR	29.93	27.513				OK
07 Aug 2:35 pm PDT	88	52	29	W	6	9.00	CLR	29.93	27.513				OK

3:39 Brian reported the field was done. No ground smoke left. Looks clear around there.

5. Conclusions

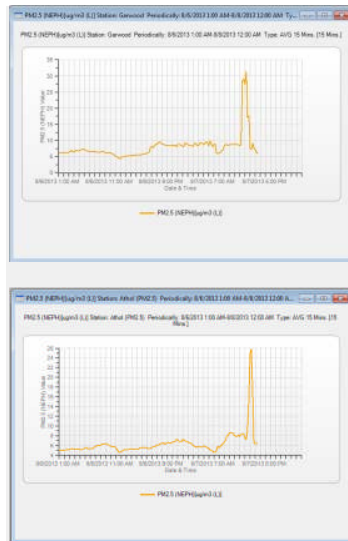
Completed 370 acres today. After the 150 acre field was completed approval was given to complete the 220. At the initial ignition of the 220 acre field flames were significant. Flames jumped Huetter rd and ignited a wheat field. This delayed completing the initial ignition of the 220 acres, however, once the crew got back onto the ignition process it went fairly quick. Even with factoring in the delay, the 220 acres went up in just over one hour. Wind direction at the Lancaster monitor indicated roughly a 200 degrees direction through the burn window. NWS airport wind direction reported more variability. Wind speeds were roughly 4 mph. The temperature was slightly higher than expected today. The 220 acre field produced very good lift with top of column reaching over 3000'. Some surface smoke was generated during the 150 acre burn especially near the completion. The 150 acre field appeared to have more residue and therefore more soil moisture which likely contributed to limiting vertical lift of the smoke. Overall, smoke dissipated very well today. No complaints of smoke impacts were received by DEQ however a citizen who lives in Coeur d'Alene near Kathleen Ave, was concerned about the practice of field burning and contacted DEQ.

The ambient temperature wind speeds and wind direction aided in good smoke dispersion for this day. The dry fuel condition was also a significant factor.

Equipment problems and escaped fire delayed quicker ignition of the both fields. If these problems could have been avoided, plume rise and reduction of ground smoke (especially for the first field) may have been greatly reduced.



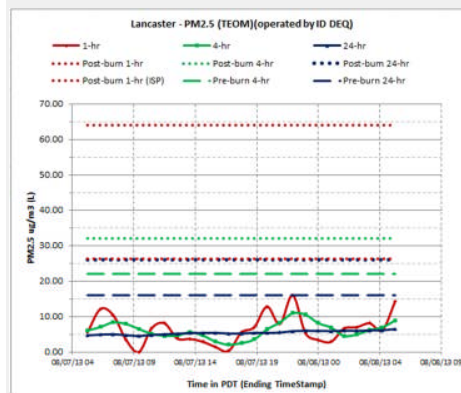
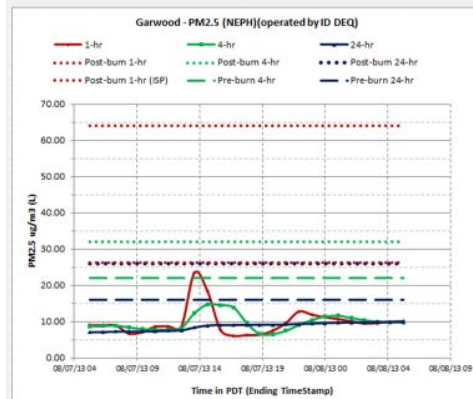
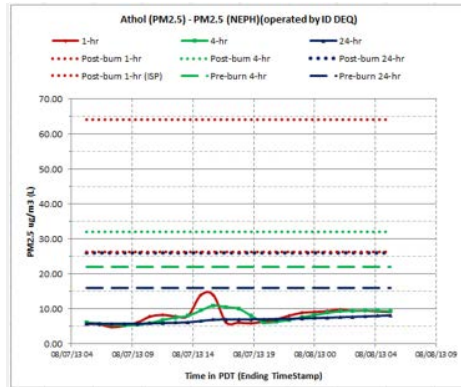
Transitory surface smoke was monitored at Garwood and Athol. The 15 minute averages are depicted below. Hourly concentration maximums were: Athol: 14.0ug/m3, Garwood: 23.4ug/m3.



8/8 Data review: Ozone measured at the Greenbluff monitor in Spokane recorded a maximum 8-hour concentration of 0.063ppm for Wednesday 8/7. Based on temperature forecast and data from 8/6 ozone was not expected to exceed 0.056 for more than 6 hours for this burn day. Data on 8/8 revealed 0.057ppm was exceeded for a full 8 hours on this burn day. The AQI for Wednesday 8/7 was 61 which is a Moderate condition.

Site:Spokane-Greenbluff -		
Date	Time	O3
		ppm
8/7/2013	12:00 AM	0.045
8/7/2013	1:00 AM	0.042
8/7/2013	2:00 AM	0.037
8/7/2013	3:00 AM	0.035
8/7/2013	4:00 AM	0.03
8/7/2013	5:00 AM	0.025
8/7/2013	6:00 AM	0.022
8/7/2013	7:00 AM	0.028
8/7/2013	8:00 AM	0.035
8/7/2013	9:00 AM	0.047
8/7/2013	10:00 AM	0.055
8/7/2013	11:00 AM	0.06
8/7/2013	12:00 PM	0.066
8/7/2013	1:00 PM	0.066
8/7/2013	2:00 PM	0.067
8/7/2013	3:00 PM	0.063
8/7/2013	4:00 PM	0.063
8/7/2013	5:00 PM	0.06
8/7/2013	6:00 PM	0.057
8/7/2013	7:00 PM	0.055
8/7/2013	8:00 PM	0.056
8/7/2013	9:00 PM	0.057
8/7/2013	10:00 PM	0.056
8/7/2013	11:00 PM	0.054
8/8/2013	12:00 AM	0.051
8/8/2013	1:00 AM	0.049
8/8/2013	2:00 AM	
8/8/2013	3:00 AM	0.042
8/8/2013	4:00 AM	0.031
8/8/2013	5:00 AM	0.031
8/8/2013	6:00 AM	0.036
8/8/2013	7:00 AM	0.04
8/8/2013	8:00 AM	
Minimum		0.022

The PM2.5 monitors (depicted below) did not record exceedences of any post burn criteria for Wednesday.



Weather Checklist

<http://intradotnet/air/CRBAdmin/BurnApprovals/WeatherChecklist?...>

WEATHER CHECKLIST/CROP RESIDUE BURN INFORMATION

Observer:	2 Paul
Date of Burn:	8/7/13
Smoke Management Area:	Kootenai

Grower Name:	Meyer, Karleen (Ag 4 Idaho LLC)
Home/Business Phone:	
Cell Phone:	208-818-5616
Permit NNumber:	CRB2013-245
Field Name:	Two
Latitude/Longitude:	47.779151 / -116.864614
Acres Remaining to be Burned:	0
Person Conducting Burn:	Schumacher, Nathan - 208-818-5616
Start Time:	2:26
End Time:	~ 3:45
Crop Type:	Turf Grass
Field located within 3 miles of an institution with sensitive populations:	True
Field Requirements: *does not include requirements when permit is issued	Cannot burn if sustained surface winds are from the Southeast, while school is in session. Cannot burn if the sustained surface wind speed exceeds 12 mph at any time. Cannot burn if sustained surface winds are from the South. Cannot burn if sustained surface winds are from the south-southeast. Permittee must have verbal approval from onsite DEQ staff prior to ignition. Cannot burn if sustained surface winds are from the east-southeast while school is in session.

General Permit Conditions - Apply to all burning crop residue.

- | | |
|----|--|
| 1. | Public Roadway Safety - The permittee is responsible to ensure that adequate measures are taken such that travel on a public roadway. (per IDAPA 58.01.01.621.02.c) |
| 2. | Fire Safety Measures - The permittee shall prevent their burn from escaping their control. (per IDAPA 58.01.01.621.02.d) |

1 of 5

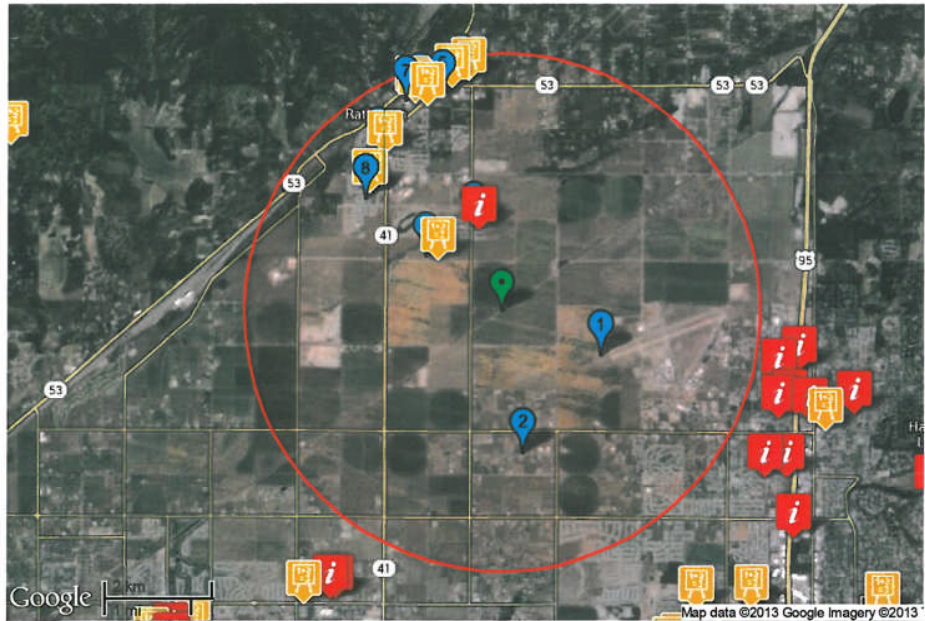
8/7/2013 8:58 AM

Weather CheckList

<http://intradotnet/air/CRBAdmin/BurnApprovals/WeatherChecklist?...>

3. **Protection of Institutions with Sensitive Populations** - Burning is not allowed if smoke is adversely impact institution with sensitive population. (per IDAPA 58.01.01.621.01.f)

DEQ Crop Residue Burning Program
 Permittee: Meyer, Karleen (Ag 4 Idaho LLC)
 Field Name: Two
 Crop: Turf Grass
 3 Mile Radius



Map Legend

- Field Location
- 3 Mile Radius Around Field Center
- Special Feature
- School
- Institution with Sensitive Populations (e.g., nursing homes and assisted living centers)

Field Information

1. Fuel Condition	<input type="checkbox"/> Brown <input type="checkbox"/> Green <input checked="" type="checkbox"/> Mixed
-------------------	---

Weather Checklist

<http://intradotnet/air/CRBAdmin/BurnApprovals/WeatherChecklist?..>

2. Fuel Arrangement (Check one)	<input checked="" type="checkbox"/> Loose <input type="checkbox"/> Compact
3. Fuel Loading	<input type="checkbox"/> Light (<=50% cover) <input type="checkbox"/> Moderate (51-70% cover) <input checked="" type="checkbox"/> Heavy (>=70% cover)
4. Horizontal Continuity (Check one)	<input checked="" type="checkbox"/> Uniform <input type="checkbox"/> Patchy <input type="checkbox"/> Wind Rowed
5. Vertical Arrangement (Check one)	<input type="checkbox"/> Standing Only <input type="checkbox"/> Laying Only <input checked="" type="checkbox"/> Mixed
6. Fuel Moisture	<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Too wet to burn <input type="checkbox"/> Mixed (or patchy moisture)
7. Fuel Size (Check one)	<input checked="" type="checkbox"/> 1-hour (diameter of 1/4-inch or less) <input type="checkbox"/> 10-hour (diameter of 1/4-inch to 1 inch)
8. Field Aspect	
9. Slope %	
10. Ignition Type	<input type="checkbox"/> Drip Torch <input checked="" type="checkbox"/> Propane Weed Burner <input type="checkbox"/> Other:
11. Ignition Method	<input checked="" type="checkbox"/> Strip <input type="checkbox"/> Modified Back Burn <input type="checkbox"/> Other:

Weather Observations	Pre-Burn		During-Burn		Post-Burn	
12. Time	2:26					
13. Temperature (°F)	87					
14. Relative Humidity %	35%					
15. Wind Direction	SW					
16. Surface Wind Speed (mph)	S	G	S	G	S	G

3 of 5

8/7/2013 8:58 AM

Weather CheckList

<http://intradotnet/air/CRBAdmin/BurnApprovals/WeatherChecklist?...>

5-Sustained; G-Gusts	2-4 6-7				
17. Cloud Cover %	5%				
18. Barometric pressure (in Hg)	29.9				
19. Soil Moisture (Check one)	~ 35%	<input checked="" type="checkbox"/> Dry <input type="checkbox"/> Moist <input type="checkbox"/> Wet			

Smoke Observations	During-Burn	
20. Color of Smoke (Check one)	<input type="checkbox"/> White <input checked="" type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Mixed	<input type="checkbox"/> White <input type="checkbox"/>
21. Surface Dispersion (Check one)	<input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Excellent
22. Plume Height	4-5,000'	
23. Transport Wind Direction	NE	
24. Transport Dispersion (Check one)	<input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/> Excellent
25. Visibility (Miles)		
26. Observations of smoke plume in relation to institution(s) with sensitive population	NA	
27. Observations of smoke plume in relation to public roadway(s)	FLAGGERS/BARRIERS/SIGNS IN PLACE	

Remarks: (Fire Behavior, Smoke Behavior, Adjacent Fuels, Sensitive populations, etc.)

Time	Remarks

- Field ignition hampered by escaped fire. Even with this problem, very little ground smoke was generated.

9/4/2013

Memo

To: **File**

From: R. Paul

Date: 09/4/13

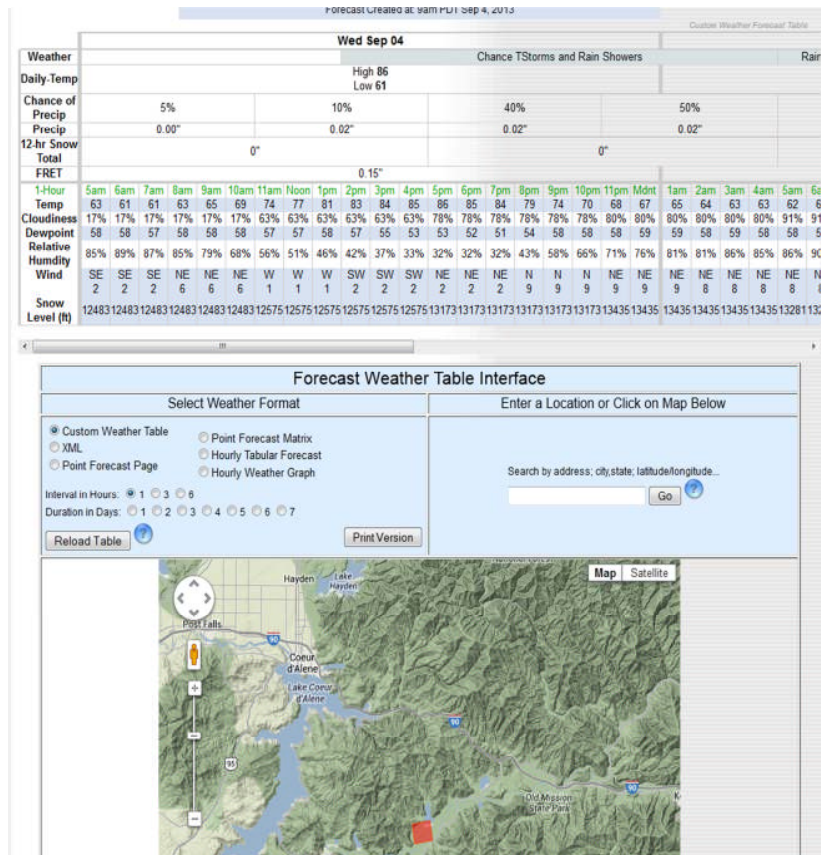
Re: Burn Day Kootenai County (Rose Lake)

Burn Decision Synopsis

After reviewing the forecasted meteorological conditions CRO initially considered making up to 100 acres available for possible burning today. Models were forecasting light winds and less than ideal transport conditions. The NWS spot forecast indicated W to SW surface winds possible. Transport winds could be more southerly trajectory. 850mb temps ~22° C. Burn time was identified as 12-4pm based on forecasted temperatures and the forecasted mixing heights. The proposed burns were discussed by phone with the North Idaho Burn Coordinator at around 9:15.

Met and AQ Data Review

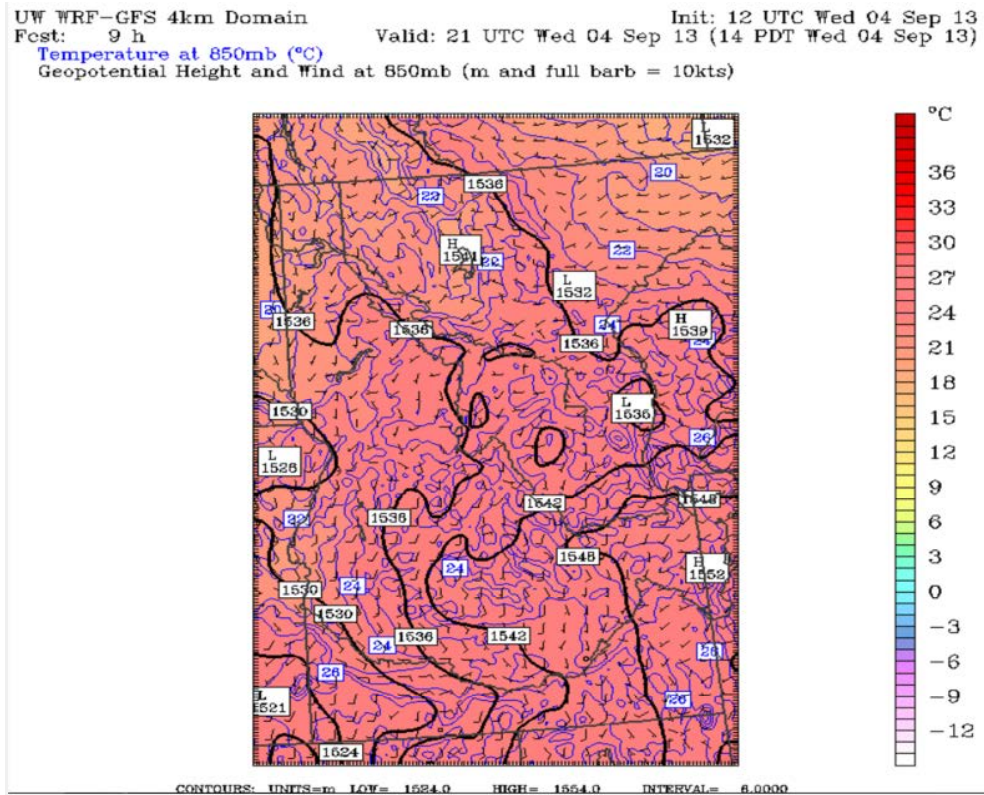
Spot Forecast



Pseudo Soundings

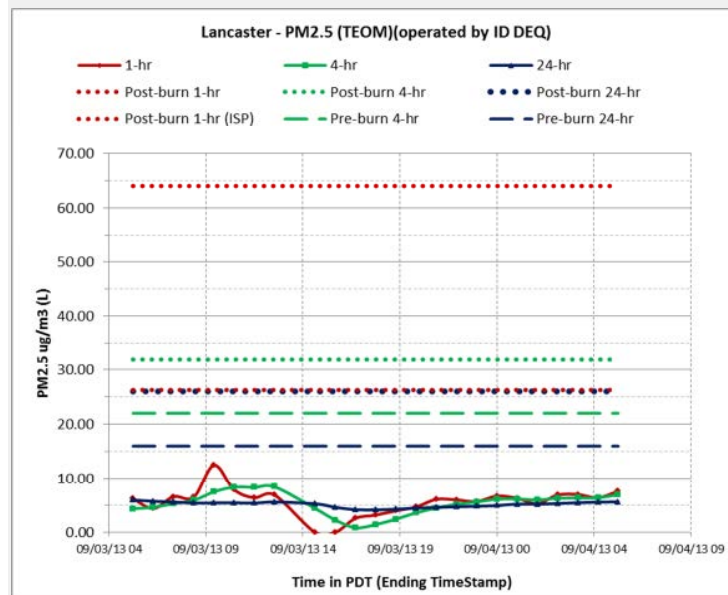
Morning Forecasting for Kootenai														
Model Resolution:	1.3km													
Model Run:	2013090400													
SiteID:	KCOE													
Name:	COUER D'ALENE, ID													
Date	9/4/2013													
Time in PDT	10AM	11AM	12PM	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM		
Vent. Index	P	P	P	P	G	G	G	M	P	NP	NP	NP		
G: good, M: marginal, P: poor, NP: very poor	1470	1809	1960	1020	5455	4951	4977	2694	1195	101	50	17		
Surface (20m) Winds	Direction	NNE	NNE	NNE	NNE	S	S	S	SSE	NNE	NNE	N	ESE	
Speed (mph)	9.3	7.1	5.0	1.6	6.3	5.4	5.2	3.0	9.1	4.8	4.7	1.8		
Surface (20m) Temperature (degree F)	75.7	79.3	82.3	85.0	87.0	88.1	88.4	88.6	86.3	81.4	78.0	76.7		
Surface (20m) Relative Humidity (%)	56.2	49.7	43.4	37.6	31.8	30.1	30.5	30.1	39.0	53.8	61.3	60.3		
Planetary Boundary Layer (PBL)	Height (feet)	1155	1857	2861	4639	6388	6716	6995	6588	968	154	79	69	Height is above model terrain surface
	Direction	ENE	E	SSE	SSE	SSE	SSE	S	SSE	NE	NE	N	ESE	
	Speed (mph)	5.7	6.1	12.0	12.5	13.6	11.7	13.6	9.3	8.1	8.4	4.7	1.8	5 kts = 5.75 mph
700mb (~10,000 ft MSL)	Height (feet)	8696	8696	8696	8696	8696	8696	8696	8696	8696	8696	8696		Height is above model terrain surface
	Direction	SW	SSW	SSW	SSW	S	S	S	S	S	SSE	SSE		
	Speed (mph)	13.6	13.0	12.1	13.0	15.9	16.1	17.4	16.6	18.8	18.0	18.2	9.3	10 kts = 11.5 mph
850mb (~5,000 ft MSL)	Height (feet)	2514	2514	2514	2514	2514	2514	2514	2514	2514	2514	2514		Height is above model terrain surface
	Direction	SE	SE	SE	SSE	SSE	SSE	SSE	SSE	SE	SSE	E	E	
	Speed (mph)	12.0	12.1	7.6	4.1	7.3	7.1	6.7	4.2	3.5	1.5	2.0	12.6	15 kts = 17.25 mph

Weather Model



Air Quality Data

DEQ



Expected Conditions

100 acres were made available today. The fields are bluegrass and heavy smoke is expected. The fields are relatively isolated so smoke production should not be a critical issue. Transport speed is not expected to be optimum but the location of the field is helpful due to its isolated location.

Burn window

Pre-Ignition Temperature/Weather Data

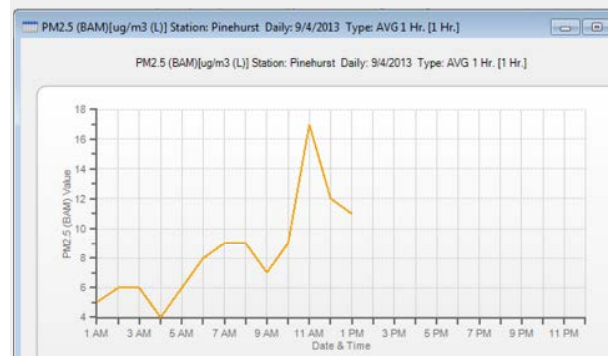
No NWS data is available on the web at this location. Weather data will be collected on-site by grower.

Communications/Observations

11:42 Mike Schlepp contacted me (Mark Boyle) per Ralph's instructions and let me a voice message. He reported weather conditions were dry and winds was aprox 6.4mph at the time of the call. Mike was ready to initiate burning of the remaining 20 acre piece and would move on to the 75 acre parcel if conditions were suitable.

11:35 I (Mark Boyle) approved the 75 acre field for Mike Schlepp and confirmed to field was identified on the DEQ public map that it was indicating that it was approved.

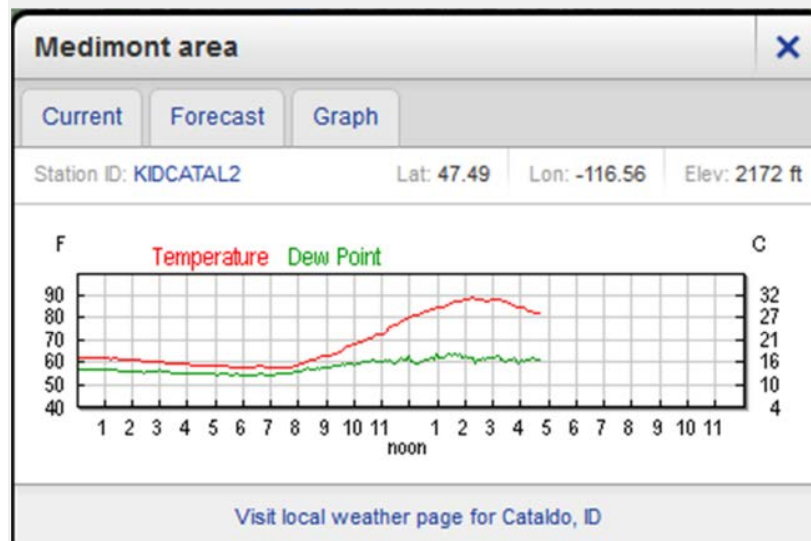
12:23 MB: I contacted grower and left a VM in which I reported that I approved the additional acreage if conditions were conducive to good smoke management. I also described the basic permit conditions for approval of this field.



Weather Data

No NWS data is available on the web at this location. Weather data will be collected on-site by grower.

4:09 MB: Grower reported to DEQ field completed. Reported good smoke dispersion and good lift. Valley was clear at time of report. Below is screen capture of Weather Underground data from growers field which is located along the Coeur d'Alene river.



Conclusions

Grower reported good smoke dispersion and very good lift. Valley was clear at time of report (4pm). Temperatures reached close to 90 degrees which aided in vertical motion of smoke. Thunderstorms developed in Coeur d'Alene about the time of the report from grower adding to the assumption that good vertical lift was occurring this afternoon and would aid in good smoke dispersion.

9/5/13 – (RP) The grower was contacted and reported both fields were completed and that the burns went very well. Completed acreage was updated on the DEQ web site.

No complaints have been received regarding this burn.

This page intentionally left blank for correct double-sided printing.

Appendix F. Legal Notification of Public Comment Period

This document was available for a 30-day public comment period from July 29, 2016 to August 29, 2016. Legal notification of the public comment period was included in the local newspapers for Pinehurst and in the Shoshone News Press and Coeur d' Alene Press. The comments received and responses to comments are combined in a separate package. See *Exceptional Events Comment Package* included with submittal letter for more details on comments received, response to comments, legal notice and certification of publications.